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[H.A.S.C. No. 108–41]

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2003-2004/41
Small Business Innovation Resea

SMALL BUSINESS INNOVATION RESEARCH PROGRAM AND THE DEVELOPMENT OF INNOVATIVE TECHNOLOGY

BEFORE THE

TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

OF THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES

ONE HUNDRED EIGHTH CONGRESS

SECOND SESSION

HEARING HELD
JULY 21, 2004

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WEDNESDAY, JULY 21, 2004

THE DEPARTMENT OF DEFENSE SMALL BUSINESS INNOVATION RESEARCH PROGRAM AND THE DEVELOPMENT OF INNOVATIVE TECHNOLOGY

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THE DEPARTMENT OF DEFENSE SMALL BUSINESS INNOVATION RESEARCH PROGRAM AND THE DEVELOPMENT OF INNOVATIVE TECHNOLOGY

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE,
Washington, DC, Wednesday, July 21, 2004.

The subcommittee met, pursuant to call, at 3:05 p.m., in room 2118, Rayburn House Office Building, Hon. Curt Weldon (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. CURT WELDON, A REPRESENTATIVE FROM PENNSYLVANIA, CHAIRMAN, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

Mr. WELDON [presiding]. The hearing will come to order. This morning, the Tactical Air and Land Forces Subcommittee will receive testimony from a series of small, innovative U.S. companies that are developing leading-edge technologies and proposing military applications of those technologies that address a variety of defense modernization needs.

The work of these companies will demonstrate to Members of the subcommittee and the American people that small businesses are capable of producing vital defense products rapidly, at potentially lower costs and, in some cases, providing new capabilities. We tend to focus on the big companies here; today, we focus on the small companies. In the new defense era, it has become imperative that small, innovative companies are afforded adequate opportunity to make their innovations available to the defense acquisition system.

The Department of Defense (DOD), in light of the events of September 11, 2001, has elevated efforts to transform our armed services to meet the Nation's needs in the century ahead. Many have concluded this transformation will depend, in large part, on making better use of innovative technologies being generated throughout the private sector, including both defense and non-defense companies.

Meanwhile, the defense industry has experienced its own transformation over the last decade, and one of the unfortunate consequences of the numerous mergers and consolidations is the continued consolidation and disturbing shrinkage of the innovative research and development base within those remaining companies.

Our witnesses today will demonstrate that small companies are often capable of producing leading-edge technologies that offer great advantages for defense programs. However, companies not already part of the recognized defense industrial base often experience difficulty penetrating defense markets and dealing with the

complex regulations and procedures that are required by the Department of Defense.

Each of you here today have experiences relating to this problem, and we look forward to discussion of your technologies but more importantly your suggestions that might make it simpler for non-defense companies to deal with the Department of Defense. That is our goal, and we are committed to make that happen, not just for all of you here today, but for all of those other entrepreneurs and small companies out there that want to be a part of the dynamics of transforming our military.

Before we get started and before I turn to my good friend and ranking Member, I have to introduce one of our former colleagues in the audience who was one of my mentors when I first came to this committee. He sat on the top row. I never thought I would be up there, because I thought it was filled with the old guys, the old bulls. Now he is out in the audience making the big bucks.

Dave, it is great to have you here. Stand up and take a bow. Dave Martin from New York. Thank you, Dave, for being here.

[Applause.]

And also a dedicated Marine veteran for this great Nation. It is good to have you here.

Now, I want to turn to my good friend and ranking Member, Neil Abercrombie, for any comments he would like to make.

[The prepared statement of Mr. Weldon can be found in the Appendix on page 43.]

STATEMENT OF HON. NEIL ABERCROMBIE, A REPRESENTATIVE FROM HAWAII, RANKING MEMBER, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

Mr. ABERCROMBIE. Thank you, Mr. Chairman. Just for purposes of the record, the statement made by Chairman Weldon is, in effect, and for all practical purposes, is a joint statement representing both of us. And it remains for me to add only that—to emphasize and to reiterate his final commentary with respect to legislation.

We intend to develop legislation that will implement the consequences of the hearing held today, and I believe that I can say safely that we have Chairman Hunter's, not necessarily his acquiescence to the legislation we put forward but his commitment is equals to ours, as is Mr. Skelton.

So I think I can assure those who are here today, not only as witnesses but those who are interested in the subject including our good friend, Representative Dave Martin, that we will carry through on this.

Mr. WELDON. I thank my good friend and ranking Member for that statement.

Before we begin the hearing today, let me explain the ground rules. I would encourage each witness to submit your prepared statements for the record, and they will be accepted in their entirety as a part of the record of this hearing, rather than read them, and to simply speak to us directly about issues or points that you want to make to us. That will allow more time for us to have a dialogue with you, a back and forth question and answer session.

Some of you have brought demonstrations, and, unfortunately, the chairman was clumsy and did some damage to one of them. I hope you don't hold that against me. But we look forward to seeing your demonstrations.

We are continuing to plow new ground today by holding an innovative hearing where we have a direct interactive dialogue with some of our country's leading entrepreneurs, and I hope you all bear with us as we try to make it run as smoothly as possible with a number of witnesses.

We have two panels, and the first panel is going to set the tone for the Department of Defense Small Business Innovative Research (SBIR) program and talk to us about their feelings on this process. And they have all been a part of this. The second panel are going to be, I believe, seven companies from across the country doing absolutely astounding work that really is cutting edge, opening new doors. We want to encourage that, and we want to build upon that.

Now, in identifying seven companies, which staff did a fantastic job, there are other companies that could have and should have been here, and I know one of our good friends and colleagues has such a company. I would like him to say a few words and perhaps introduce that person who is not going to be a witness but let the record show that he is here with us today.

Jim Cooper, I recognize you.

Mr. COOPER. Thank you, Mr. Chairman. I appreciate your holding this hearing, because it is a very important topic. We need to be doing all that we can to help small business and to help create jobs in this country.

I hadn't realized it prior to this hearing but a long-time friend of mine, Bob Pap is in the audience who leads a company called Accurate Automation in Chattanooga, Tennessee. He pointed out to me that there are some three companies in Tennessee—Bob, if you would stand and be recognized—that there are three Tennessee companies who have been unfairly disadvantaged by the current process, so we are very interested in curing that.

Bob and his wife, Reba, have run a great company for many years now, been the recipient of numerous SBIR grants, it has got remarkable state-of-the-art technology, and they were $31 million cheaper than any other bidder in the recent process and yet still were not able to get the contract. So we want to make sure that it is a level playing field, that small businesses are fairly treated. We are not asking for any special treatment here, but just so that all businesses in America get a fair shake. That is what we are interested in.

Bob brought a statement. I would like to ask unanimous consent that it be inserted in the record, and——

Mr. WELDON. Without objection, so ordered.

Mr. COOPER [continuing]. We look forward to working with all the companies here today to get a fair deal from the Pentagon.

Mr. WELDON. We appreciate you being here. We appreciate your work in the SBIR program. We want your input, so we will accept your statement as it is written, for the record. Any other comments you would like to make we would welcome, because the record will be open, and you have got a great advocate here in your Member,

and I am sure he will make sure that we are listening to the reasons why you weren't successful in this most recent bid.

Would my good friend from California like to make any opening statement? You also have a company here.

Mr. MCKEON. Thank you, Mr. Chairman. I too want to thank you for holding this hearing. I think I have had some real concern the last few years about the consolidation in the industry, and the large number of companies have become a small number of companies. And a lot of the innovation comes from small companies who have been kind of squeezed out of the picture.

And I know we have a company here from my district represented. Tom Cuda's here from Vista Controls, and they are a company that was bought by a little bit larger company, but they are still a small company doing great things.

And when the president came into my office a few years ago, he said he had been to another person here on the hill and wanted to talk to him about what they were doing and the person—I am not going to mention any names—had kicked him out of her office and said, "You know what you are doing is shameful." And, actually, what they were doing was helping our armed services who are helping defend our freedom. So when he came to me I said, "I would love to come and talk to your people," and I have watched them grow and they are doing an outstanding job.

I have another friend in the audience here that I just met a couple of weeks ago that has something that will really help protect the lives of our services, our people serving in the services, and he flew overnight to be here this morning to meet with Chairman Hunter, and I am just happy that he is here and happy that the people in the audience representing these companies are doing the outstanding things to help, again, defend the—help the people that are defending our freedoms.

Thank you, Mr. Chairman.

Mr. WELDON. I thank our friend and colleague, and that kind of summarizes why we are having this hearing.

The companies that are here represent literally thousands of small companies and entrepreneurs across the country who are looking for an opportunity to help us reduce costs, deliver better products in a more timely manner. And oftentimes they get squeezed out by the large primes. We work with the large primes all the time, and they do good work, but, in my opinion, they don't have the hunger, they don't have the desire, they don't have the ability to go out and do the kind of innovation with the low overhead that the kind of companies we are going to see today have.

And so today we are here to tell your story. When you speak, all of you who are witnesses, you are not just speaking for yourself. You are speaking on behalf of all of those other entrepreneurs out there, all those other SBIR contract awardees, all those people who would like to be here to tell their story. So we would ask you to think not just in your own parochial terms but in the terms of all those other people who have those great ideas who didn't get to come to the table today but who we want to encourage and we want to assist.

The first panel will discuss the Small Business Innovative Research program and offer their thoughts on how it might be im-

proved. We welcome our first panel members. The panel has a combined opening statement which will be entered into the record without objection. In order to be most efficient, I would like to withhold questions until this panel has completed its opening remarks.

We will begin with Mr. Nick Karangelen, president and CEO of Trident Systems. We will move to Ms. Heidi Jacobus, chairman and CEO of Cybernet Systems Corporation, and then to Bill Broderick, chief financial officer of Analytical Graphics. Thank you for your testimony.

Nick, the floor is yours. If you can hold it to five minutes, we would appreciate it.

STATEMENT OF NICK KARANGELEN, PRESIDENT AND CEO, TRIDENT SYSTEMS, INC.

Mr. KARANGELEN. Thank you, Mr. Chairman.

Mr. WELDON. And we will try to do the same.

Mr. KARANGELEN. Thank you, Mr. Chairman. Mr. Abercrombie, distinguished Members of the committee, it is an honor for us to be here today to represent small business and to give you some of our perspectives from the small business community that serves the Department of Defense. I am here with Heidi and Bill, and actually we have a number of other Small Business Technology Coalition (SBTC) members here, but we are members of the board, and we represent——

Mr. WELDON. Can you explain that when you say you are members of the board? Can you explain that?

Mr. KARANGELEN. The Small Business Technology Coalition is an industry association that is non-partisan, non-profit, businesses that is dedicated to the formation and the growth of technology-focused, research-oriented small businesses. And the board of directors, there are about 11 of us or 12 of us total. Three of us are actually on a special committee to address the topic that we are here to discuss today, which is the phase III transition of SBIR technology.

And I would like to begin this afternoon by expressing our deep appreciation for all the things that you do, each Member of this committee, the outstanding efforts that you have made to support our men and women across the globe that are defending our freedoms and raging a war on terrorism. Thank you.

As you know, small business is really widely seen as the engine of innovation in America, and there have been a number of studies that show that over half of people in this country are employed by small businesses, but did you know that over a third of the engineers and degreed scientists and engineers in this country are employed by small business? Fourteen percent of all non-federally funded research and development (R&D) expended by small business, a large percentage of patents that are awarded are done by small business. And yet only about four percent—those same studies report consistently that about four percent of federally funded R&D is expended by small business.

And we think that there is a—your efforts to try and broaden that base are really well served and will serve the DOD as well as the small businesses that are involved.

And as you know also, the SBIR Program has three phases. The first two phases are funded by the set-aside that is in legislation, which focuses on R&D on topics that the major programs are interested in. Phase III is the area where we take those successful phase Is and phase IIs and we transition them into the programs, and this is the area that we think needs attention, needs your committee's attention.

Several years ago, the Congress clarified the phase III contracting and data rights issues, which really opened the door for managers across the board in DOD to let contracts and to bring these technologies. And a number of them, a small number, a small cadre have done this. In fact, one of them, the program executive officer for submarines in the Navy, has awarded over $700 million in phase III contracts since 1995.

This one small part of the Navy, which is of course a small part of the whole DOD, has taken the SBIR Program as a crucible for testing small business capability, and he is used it in a way to vet these companies' technologies and to vet their management as well—do they have accounting that supports the standards that we need to do government contracting? And from that he is awarded hundreds of millions of dollars in contracts.

And so we submit that by that example there is an awful lot of SBIR technology that is not being transitioned, because if so much is being transitioned by so few, then we stand here to tell you that there is a lot more to be done. And we really resonate with the language that you put in your fiscal year 2005 authorization bill that suggests and that requires the Department of Defense to look at how to do more of this phase III work. And we think that that merits a follow up in fiscal year 2006, and I appreciate Mr. Abercrombie's commitment to do something more next year.

So we have a couple of suggestions for you. The first one is that nearly every program manager in DOD has to go through the Defense Acquisition University course, and while they have had some guest lecturers to talk about SBIR in transition, in fact, Mr. McNamara, who is a champion of this, has spoken there. We believe that a permanent sizable portion of that course could be focused on small business, not just SBIR but the transition of small business technology into these programs, because their focus, of course, is big program, big company, big product.

The second suggestion that we have is one involving an incentive program, and the idea is that there are a number of bright and forward-thinking program managers that are awarding phase III contracts, but I think we could get a large number of other program managers over the edge, if you will, to awarding more phase IIIs if there was an incentive that maybe eclipses some of the cultural issues about that today.

And our idea is to provide some matching funds so if a program manager said, "Gee, there is a promising technology, but I am a little worried about spending all these program funds or that it would be a one-to-one match or maybe some other match," that we would arrange—and of course there would be some limit. We wouldn't want Dick McNamara to get $127 million. We are trying to incentivize a broader base. But there would be a limit.

And we think that on a temporary basis or on a trial basis this would get sort of the juices flowing, if you will, to get more and more government program managers to make those investments in the transition of what we know now is good phase III technology.

And Heidi and Bill are going to take a few minutes and tell you a little bit about their experiences and some of the examples that they have that are parallel to this SBIR.

[The prepared statement of Mr. Karangelen can be found in the Appendix on page 52.]

Mr. WELDON. Thank you.

Ms. Jacobus, the floor is yours.

Ms. JACOBUS. Thank you.

Mr. WELDON. You are welcome to give a statement. And we have been joined by Dr. Gingrey from Georgia.

STATEMENT OF HEIDI JACOBUS, CHAIRMAN AND CEO, CYBERNET SYSTEMS CORPORATION

Ms. JACOBUS. Thank you, Chairman Weldon and Ranking Member Abercrombie, subcommittee Members, for this opportunity to testify about the importance of SBIR. I appreciate the opportunity to talk as a woman-owned business.

Mr. WELDON. Can you move the mike a little closer to you——

Ms. JACOBUS. Oh, I am sorry.

Mr. WELDON [continuing]. So the stenographer can get your statement?

Ms. JACOBUS. How is this? Okay. I appreciate the opportunity to talk about my experiences as a woman-owned business working within the Department of Defense. My name is Heidi Jacobus, and I am the founder and chief executive officer of Cybernet Systems in Ann Arbor, Michigan.

The SBIR program provided me the opportunity to start my own company, and I am confident this company would not exist without the program. I am an unlikely entrepreneur. My family had no background in business, my immigrant mother could not speak English when I was born; in fact, neither of my parents finished high school. Both worked, sometimes two jobs, in factories, but they valued education. And thanks to their hard work I was able to pursue an advanced engineering degree.

Before I finished my Ph.D. in computer science at the University of Illinois, I found a near-perfect match for my Ph.D. thesis topic and an SBIR topic from the Defense Advanced Research Projects Agency (DARPA). I can still remember the day 15 years ago when an Air Force colonel called me to tell me that my proposal was, quote, the best he had ever read, so I was thrilled and energized and Cybernet began in my daughter's bedroom after I moved her in with her younger brother.

So today, Cybernet has won over 200 SBIR contracts, making us the most successful winner in Michigan, in fact in the entire Midwest. My small company employs nearly 50 engineers and scientists. We have been granted 22 U.S. patents. Under SBIR, we developed a telemedicine device called MedStar, which has earned SBA 510(k) certification and has received national awards.

Recently, MedStar was inducted into the Space Foundation Hall of Fame in Colorado Springs where Buzz Aldrin gave five of my engineers medals. In addition, they also honored the SBIR program managers from National Aeronautics and Space Administration

(NASA), DARPA and National Institute of Health (NIH) who together had the foresight to fund the foundation work years before.

I am sure the committee's heard this before but SBIR is about the only avenue for small high-tech businesses like mine to do R&D work for the Department of Defense. Without it we would not exist. This program's vital to us because it is tough out there for us. Every day, my small company with 50 people competes against $30 billion defense giants for work.

In the technology areas we care about, we have seen a trend in government contracting toward very, very large contracts. Realistically, these can only be performed by very large contractors. The opportunity for small, innovative firms to bid on these contracts is very small. Even though we might well have more technical expertise in a specific area, we have to compete with the prime.

What we found is unfortunate. They rarely have it in their best interests to carve out critical pieces of the work for us. I would add that a woman-owned small business has even more daunting obstacles. We have strong skills, but we lack the network of connections, military experience and access necessary to break through. There are currently no mentoring programs that reach out to women, and that is why this program is so fantastic for high-tech businesses. It is crafted brilliantly by Congress to provide people like me a pathway to perform this advanced R&D.

We have developed a host of technologies ranging from telemedicine to gesture recognition to state-of-the-art robotics, and all were stimulated by SBIR. But winning these contracts is tough. The competition's fierce, and in 2002, there were 14 phase I proposals for every one awardee.

A few of our technologies have progressed to phase III. We have just started a contract that should result in a product delivered to Iraq in just a few months time. The basis is an Army phase II contract for Picatinny Arsenal where we are using a computer vision and sensor system to identify different kinds of ammunition in a warehouse setting. The war created an immediate need for a system that could inspect large quantities of ammunition in the field.

An engineer at McAlester Army Ammunition Center read about our project and called us. We demonstrated that we could quickly produce a system to meet his specs. And following this there was a real urgency to get us on contract, and under SBIR rules it is possible to sign a phase III immediately. But the McAlester contracting office had never done this; they were hesitant. But, fortunately, we found another office that was willing to take the paperwork over.

Our contract began just last week, and we expect to deploy a working system to Iraq in three months. And I don't know any other acquisition path other than SBIR that could make this quick deployment possible.

I commend the Congress because it was your reauthorization of SBIR that clarified and strengthened the program with regard to phase III contracts, making it far easier in these situations. So that is why I believe a proposal to create a phase III incentive program could be so important. It could provide momentum to move promising technologies forward and provide a path to get them to the end users, to the field. And we are aware that this could be contentious,

but the small additional set-aside can have a revolutionary impact on the DOD.

I gave the example of how we are delivering our ammunition inspection device in months, not years. We need to be able to respond rapidly with affordable solutions that can be put in the hands of military personnel. The SBIR program and small high-tech businesses are one means to accomplish this. Making these changes in thinking is tough, but the incentives will encourage the Department of Defense to draw more heavily on the innovation that we provide. This proposal is a tremendous first step, and I believe the benefits could be truly transformational. Thank you.

[The prepared statement of Ms. Jacobus can be found in the Appendix on page 62.]

Mr. WELDON. Thank you for your statement, and thank you for your leadership and tenacity.

Our third witness is Bill Broderick, Analytical Graphics. Bill, welcome.

STATEMENT OF BILL BRODERICK, CHIEF FINANCIAL OFFICER, ANALYTICAL GRAPHICS, INC.

Mr. BRODERICK. Chairman Weldon, Congressman Abercrombie and the Members of the subcommittee, I would like to thank you for this opportunity to testify about small business participation in the DOD.

The key question I pose for today's hearing is this: How can DOD find contractors, adopt best-of-breed technologies in small businesses when, for the most part, the current acquisition environment has disincentives to use lower cost, commercially available technology?

In the short time we have, I hope to provide some insight into the critical role of small businesses——

Mr. WELDON. Can you pull that closer to you, please, the mike?

Mr. BRODERICK. Sorry. Is it on? Okay. I hope to provide some insight into the critical of small businesses in supplying innovative and affordable technologies to the defense community and the challenges with insertion of these technologies into DOD mainstream programs. Despite the demonstrated benefits of our technologies, many small businesses continually face opposition to the insertion of proven technological innovations into DOD programs.

Employing more than 120 engineers and scientists, and some of them the best in the world at what they do, AGI has developed more than 3 million lines of commercially available code, which provides national security and space organizations with unparalleled and cost-effective capabilities that can be rapidly deployed.

As we speak, our software is in use at the Pentagon, remote commands in Iraq, Qatar, Kuwait, Afghanistan, United States Central Command (CENTCOM) and elsewhere providing battle space situational awareness for our war fighters. This software capability fuses together the exact position of assets that are in theater as well as intelligence and threat data into a single common operating picture in 3D, in real time.

Sounds almost conceptual but it is not. It is already deployed and being utilized to assist our war fighters every day. Yet time and

time again, we see programs attempt to reinvent our technology at excessive cost.

Based on AGI and other small business experiences, there are two acquisition practices that create unnecessary challenges for the small business community: One, the traditional cost-plus award fee contract system, and, two, consolidation of contract. While the cost-plus mechanism is appropriate in many instances, it does not work when software and other technologies are available in the marketplace. Cost-plus has increased the difficulty of offering proven innovations to the DOD by inadvertently rewarding high expenditures and reducing incentives to cut costs.

Furthermore, industry consolidation and contract bundling significantly reduce defense marketplace competition by reducing small business access to programs and DOD's leverage over prime contractors. Consequently, true capitalistic market forces are not prevalent in the defense marketplace to promote healthy competition resulting in the most affordable and capable technology being brought to bear on our national security.

We don't want adversary relationships with major DOD contractors and program officers, rather we prefer to have a healthy working environment that fosters innovation between small business and large DOD contractors in a truly competitive marketplace, not an environment where DOD contractors feel threatened by proven technologies that are disruptive to their business interests.

We are well aware that this problem is complicated and multi-faceted and that some progress has been made. Through corrective actions, we can work together to realize health competition and technical innovation in the U.S. defense marketplace. We believe that the current transformation may offer appropriate vehicles to further collaborations between small, innovative businesses, large defense contractors and DOD.

AGI applauds Congress, DOD and industry's efforts in recent years to more closely examine the application of commercially available technologies in DOD programs. However, we would urge the Department of Defense to go one step further, make the information collected available to Congress through a progress report in order to facilitate an open dialogue on the implications of commercialized technology insertion into DOD programs.

We believe putting the facts on the table open for review by Congress and businesses alike would facilitate a more productive dialogue. Ultimately, this collaboration would illuminate a path to which Congress, the DOD and industry could foster greater inclusion of proven small business technologies. This would help reduce program costs and improve our national security.

This industry has done some amazing things technologically, but in order to push the technology envelope far beyond the capabilities of our adversaries, we need to be better at embracing available best-of-breed technologies. Without finding a solution to the question I posed earlier, our national security will not be able to leverage the small business brain power embedded in the innovative technologies they have developed nor will the government be able to effectively leverage investments made in the SBIR Program.

We are grateful to the subcommittee for holding this hearing on topics vital to the health of DOD and for the opportunity to testify.

We are also available at your convenience to discuss in greater detail any initiatives discussed in this testimony. I welcome your questions, and, again, thank you.

[The prepared statement of Mr. Broderick can be found in the Appendix on page 66.]

Mr. WELDON. Thank you. Thank all three of you for outstanding statements and, more important, for your work and your innovation.

I will start off by asking has the Small Business Technology Coalition provided for us a series of recommendations of actions that you think we could take? You have mentioned some of them here. Have you consolidated that into a series of recommendations?

Mr. KARANGELEN. We haven't but we certainly could. We would be delighted to provide you with something, a white paper with that.

Mr. WELDON. That would be very helpful because you have given us some good ideas, and we will be asking you about those ideas. If you could give us actually a list of suggestions that you think we should be taking and working with our staff director, Bob Lowtrip, who is very much into this issue, I think we can be very helpful to you. We want to be helpful, and I would say virtually every member of not just this subcommittee but the full committee wants to try to encourage more of what you all are doing.

Nick, I would start off with you. The percentage of phase II SBIR projects that transition to phase III, how much do you think that percentage would increase if we had matching fund incentives available?

Mr. KARANGELEN. I think that is a very good question, because you don't expect every single SBIR to produce an outstanding technology that is ultimately going to transition. And if we look back, actually, we have—I saw John Williams here, our Navy SBIR program manager who has done a really outstanding job in promoting small business phase——

Mr. WELDON. Why don't we give him another plug? Do you want to introduce him again?

Mr. KARANGELEN. Yes. John Williams from the Navy——

Mr. WELDON. John, stand up. Thank you for the great work you do. Thank you.

Mr. KARANGELEN [continuing]. SBIR program manager. He is done a really awesome job. And in fact the numbers show it. Eighty percent of the DOD Fiscal Year 2003 phase III SBIRs came from the Navy across the entire DOD. And so I take the Navy as an example. Because if we say they are doing a pretty good job, one in 11—and I just looked at 1998 and 1999, and I am sure John will correct me downstream if we get some better data—but if you look at 1998 and 1999, one in 11 of the successful phase IIs was transitioned to phase III. One out of 11, so that was about 25—in 1998 and 1999, in the 2 years, about 25 phase II SBIRs in the Navy got transitioned to phase III.

We don't have the statistics for the rest of the DOD, but since we know that the Navy did 80 percent, you can see that since they are one-fifth of the total DOD and they are 5 times the rest of the DOD, it is about—the rest of the DOD is about one in 200 or maybe one in 180, and that is a gross sort of extrapolation.

But the point is we don't even think the Navy's maxing out, so we probably could go from somewhere like one in 100, if you look at the current DOD, to more like one in 10. And, again, if you look at the way the program executive officer summaries, Mr. Dick McNamara has done it, just since 1995 he is awarded $700 million in phase III contracts. That is non-SBIR money. That is program money that has saved him hundreds of millions of dollars. And, again, if we had time, we could tell you some of those stories.

Mr. WELDON. Thank you. I have one other question before I turn to my colleagues, because we have so many witnesses, and it ties into something that, Ms. Jacobus, you mentioned about you are somewhat at a disadvantage because this industry is so heavily dominated by men and men who have been in the service who come back and work the process very well. I know that and see that all the time.

And you suggested there is no mentoring program for women. And I know all you want is a level playing field, so how do we give you a level playing field? Do we provide a mentoring program for women? What suggestions do we have that you could think would help other women have the same kind of American success story that you have? And if you could pull the mike up to you when you respond.

Ms. JACOBUS. Well, I did a very thorough study of Cybernet's technology areas and found that in the description of our contracts that the contracting officers give us called FSC, Federal Supply Code. The areas that we work in we, Cybernet, are unique. In many cases, we are the only woman-owned business in the entire Nation getting contracts under that FSC code. There exists contracting rules which allow contracting officers to give a sole source contract if there are two or more women-owned businesses presenting their technology, but in this case it can't be implemented; I am the only one. So it is a catch–22 for me.

I know, for example, last year I was one of 20 women recognized in the State of Michigan by the Association of Women in Computing as one of the outstanding Michigan women in computer science. And if you look at the register of those women, I am the only one who is an entrepreneur. Everyone else works at universities, for the state, for gigantic Fortune 10 companies.

So I am very much alone in this, and I don't need to be; there is a lot of talent out there. But, obviously, the obstacles that we deal with every day maybe make the choice of hanging up a shingle and starting a company more difficult than taking a job at a large business.

Mr. WELDON. Well, we would appreciate giving you more time to think about this and coming back with some very specific ideas——

Ms. JACOBUS. I would like to. Thank you.

Mr. WELDON [continuing]. Of what you think we could do to help create more people like you doing what you are doing, again, not because we want to give you some special advantage; we want to give you a level playing field. And what you are saying is you don't have that right now, and we want to find a way to level that, so that we can get more people like you to be successful.

Ms. JACOBUS. Right. The data I have gathered doesn't suggest that we have a level playing field.

Mr. WELDON. Mr. Abercrombie.

Mr. ABERCROMBIE. I have a question that goes to Mr. Broderick, and then it will go back to you, Ms. Jacobus—is it Jacobus?

Ms. JACOBUS. Pardon me?

Mr. ABERCROMBIE. Am I pronouncing your name correctly?

Ms. JACOBUS. Jacobus, but that is fine. Thank you.

Mr. ABERCROMBIE. Jacobus. Thank you.

Mr. Broderick, you mentioned, if I heard you correctly, contract consolidation. Is that the same thing as contract bundling?

Mr. BRODERICK. Yes, it is.

Mr. ABERCROMBIE. Are you familiar—can you pull that mike over?

Mr. BRODERICK. Yes, it is, Congressman.

Mr. KARANGELEN. If I could add something to that. It has the exact same effect, but in technical terms, contract bundling is the bundling of existing contracts. What I think we are addressing here is something that is a little more insidious, which is there are no existing contracts to bundle, but they are just bundling up the——

Mr. ABERCROMBIE. I understand that—when I said it is the same thing I really didn't mean it literally it is the same thing, but we are talking about the same kind of process here where, in effect, you go to globalize or giantize the contract award, which, in effect, cuts out the small. In other words, you can compete, good luck, you won't get it. It is not going to happen. I can try out for the Green Bay Packers too. I can be a walk-on for a scholarship or something like that. Those things aren't going to happen, so they become, in effect, a dodge, and we all wink and pretend that it is happening.

Now, this is something that has been going on in the Pentagon I am going to say about the bundling here, so you get it at both ends, that which involves initiative and innovation at the start, contract consolidation, or where you have existing contracts and they are consolidated, if you will, and bundled, and service may not be put forward.

We have had arguments in here about freight forwarding, for example, and what happens is is you get these relocation companies come in and they are able to get these contracts. Of course, then they subcontract it out to people who should have gotten it in the first place so that you end up with somebody having their furniture all busted up and who do they complain to? Some regional office of a relocation company who could care less, and then the subcontractors get screwed on payment.

Do you find yourself or do you find businesses with whom you are associated, particularly members of your board, in a position where they subcontracted after a consolidation contract is awarded?

Mr. BRODERICK. In a lot of cases, and I will just name the Future Combat Systems (FCS) as an example, where FCS is a very, very large contract for the Army. There have been strong language to say, okay, there will be a certain amount of small business subcontractors against this big prime. And a lot of times with very good intentions program offices and even prime contractors start out with that intent, but it is just human nature, if you are a big horizontally-integrated company——

Mr. ABERCROMBIE. And we legislate to get rid of human nature. [Laughter.]

That is why we are holding this hearing.

Mr. BRODERICK. Thank you very much. We are delighted that you are in that mode. And in fact we think we can help you break that culture.

Mr. ABERCROMBIE. So the answer is, yes, that you find yourself then being subcontracted to?

Mr. BRODERICK. Not enough.

Mr. ABERCROMBIE. Not enough, but——

Mr. BRODERICK. We would like to be subcontracted.

Mr. ABERCROMBIE. Help me here. Does that happen?

Mr. BRODERICK. It happens.

Mr. ABERCROMBIE. Okay. Now, when that happens, is there an overhead sum that is taken out by the larger company then when you do their work for them?

Mr. BRODERICK. A considerable one. It is the cost to the government.

Mr. ABERCROMBIE. And each time the contract is awarded, they take their overhead out, don't they?

Mr. BRODERICK. Absolutely.

Mr. ABERCROMBIE. And they are running you. You end up working for them doing the work that you did in the first place, and they take an overhead rake off at the same time.

Mr. BRODERICK. That is true.

Mr. ABERCROMBIE. Okay. That is what it is. They are not doing anything, but they are taking it off the top. Doesn't that add to the cost?

Mr. BRODERICK. It does add to the cost.

Mr. ABERCROMBIE. Okay.

Mr. BRODERICK. In some cases, integration is necessary, but in a lot of cases they should be contracting with the small businesses, yes.

Mr. ABERCROMBIE. Okay. But when it gets awarded in the first place, okay.

Now, Ms. Jacobus, on the question of—see, I don't have the same difficulty Mr. Weldon has with affirmative action. We can't use the word—I can use it, you see. As you can see, I represent Hawaii, and I don't look like Don Ho, so I am affirmative action in Hawaii. [Laughter.]

I do look like Don Ho; we are both short. I don't have the same number of families he has, though.

But on this question then, the same thing on women-owned businesses. It is ironic—I won't say it is amusing, but it is ironic that you are having difficulty here. We already have affirmative action with DOD contracts when it comes to women-owned businesses and services coming in and services coming in because there are certain set-asides, what we call set-asides, for minorities and women-owned businesses.

If you were in the construction business, you would probably have an easier time getting a contract as a small business, woman-owned business, if you were a contractor doing electrical work, let's say, as opposed to doing what SBIR traditionally handles. Are you familiar with that side of things?

Ms. JACOBUS. I am absolutely familiar with it. In fact, in the Department of Transportation, there is a program called, Disadvantaged Business Enterprise, and in fact Joanne Payne is here who is one of the thought leaders in putting that program into place. And she had to struggle for years in order to get women in the construction industry contracts in a Federal program——

Mr. ABERCROMBIE. Be put in by law. My point is——

Ms. JACOBUS. I am sorry.

Mr. ABERCROMBIE [continuing]. Then one of the suggestions I hope you will take a look at is that we have something similar with respect to high tech or traditional SBIR research activity that would be a set-aside for minority-owned businesses or women-owned businesses. And I don't have any problem doing that at all. I don't have the statistics in front of me, but I will bet there are damn few female contract officers.

Ms. JACOBUS. I think that that is true, but I don't think there is a set-aside for women in the Department of Defense. There are goals, just as there are goals for—but the goals are not reached.

Mr. ABERCROMBIE. Yes, but then there are some of us, though, in Congress who chase the Department of Defense to try and make them live up to their goals.

Ms. JACOBUS. Right.

Mr. ABERCROMBIE. We shouldn't have to do that. I agree with you, so maybe one of the things you need to take up, and my suggestion, is get rid of the goals and get something settled that they have to give us a reason why they can't do it as opposed to whether or not that is a goal. My goal is to be six feet tall and dunk a basketball. I am 66. What do you think my chances are? I don't give a damn about goals. What I want to accomplish is specific paths set forward in law, in legislation that will require them to do things or give a reason why they can't.

Ms. JACOBUS. And I agree with the specificity that you point out because even when large prime contractors say they are meeting their goals in working with small business, when you shine light on what they mean by that, it turns out they are sending subcontracting money on travel expenses by buying their travel through a small business travel agency. I have a——

Mr. ABERCROMBIE. There are all kinds of tricks.

Ms. JACOBUS. Right. I have a pitch that General Yakovac made early in the Future Combat Systems, which sounded—it was the key tenets of the program, and there are three little things he said that heartened me. It is going to create an opportunity for the best of industry. Well, we think we are amongst the best. It maintains and shapes the industrial base of the future. We think we are the future. And to retain competition. Well, more is better. We are competition. And we don't see that that happens in this program, in the end.

Mr. ABERCROMBIE. So when you put forward the suggestions to the chairman that he is requested, could you take these things into account?

Ms. JACOBUS. Absolutely.

Mr. ABERCROMBIE. And don't hesitate—when we say suggestions, you don't have to write legislation. We have experts in here to do that. You have got to outline to him those things that you believe

would be necessary to go beyond feel-good legislation that doesn't have any teeth in it and will not end up actually accomplishing what we want to do. We want to get beyond goals and aspirations, okay?

Ms. JACOBUS. Thank you.

Mr. ABERCROMBIE. Thank you.

Mr. WELDON. Thank you. And if you have an entrepreneur who can tell us how to grow Neil to six foot, include that in your recommendations. [Laughter.]

Ms. JACOBUS. Genetic engineering.

Mr. WELDON. Mr. McKeon is recognized.

Mr. MCKEON. Thank you, Mr. Chairman, and thank you again, witnesses, for being here today and for the things that you are doing to help this program.

Mr. Karangelen, would you please review again for the committee your recommendation for providing a funding incentive to the program managers to encourage them to give greater consideration to the small defense businesses?

Mr. KARANGELEN. Yes, sir. What we are suggesting is that some money be set aside so that a program manager who wishes to transition a phase II, a successful phase II technology into his program and maybe hasn't done it before, we could put some caveats on it of some type, and was hesitant, and let's say that that cost was going to be $2 or $3 million. Well, if it was a $3 million cost over a year and a half or two years and he could get matching funds, meaning he would only put up $1.5 million of program funds and then receive a $1.5 million from this separate pot, that would be a strong incentive for him, and it would counter the cultural barriers which exist today like, "Well, gee, our program's really on track, isn't it, and our prime contractor can do that, can't he," which in a lot of cases may be true, but as we have seen in a number of examples, often disruptive technologies that really change things, like in the submarine force where a single prop sub was built for one-hundredth the cost of the one the prime was developing. That doesn't come unless it comes out from the outside.

Mr. MCKEON. So a manager then would see his money go twice as far——

Mr. KARANGELEN. That is correct.

Mr. MCKEON [continuing]. Under an outline the way you suggest. What are the potential sources for funding for this incentive that we might look at?

Mr. KARANGELEN. I think you have the sort of traditional from the congressional point of view. We could make an appropriation. Appropriation could be made, I should say, that was for a fixed amount of money to fund this kind of activity, or a set-aside, much like the SBIR program is set aside today. Two and a half percent of all R&D funds are set aside for the SBIR program. And I don't think it would be a stretch to say that one percent or half a percent—an additional half a percent or one percent of R&D set-aside could be created for this incentive.

And I think, ultimately, you might even be able to retire that part of the SBIR program, because as soon as you got a cultural change—it might take years, but as soon as you got the cultural change and as soon as you had more Dick McNamaras running

around really bringing small business in and testing their technology across the board, you wouldn't need that incentive, because they would have the real incentive, which is value in schedule and cost and performance.

Mr. MCKEON. I don't think I will be here long enough to see a program once started phased out. So if we were to set aside an additional 1 percent for this, you could phase that in because you probably wouldn't be—as a new program, you are probably not equipped to handle the full 1 percent the first year; it would have to be phased in.

Mr. KARANGELEN. Yes, sir. We have got the experience of the SBIR program behind us, and that is exactly what we need to do. Because if you have this 1 percent, which represents a large amount of resources with respect to the overall program, it wouldn't catch up fast enough in the first year, so we maybe did a quarter percent, then a half. We phase it in. That would match the Department of Defense ability to really use it efficiently.

Mr. MCKEON. Where would the opposition come from for this?

Mr. KARANGELEN. I think it would be very similar to what you saw in the SBIR program in the beginning, not that any one organization or group of people is opposed to this. I mean you might think the primes are opposed, but they are really not. I think there are lots of people that believe that small business has a lot to offer, but it is sort of the status quo. I mean we have a—we are a bureaucracy and people don't like change, and so I think we would see resistance from Members in this committee all the way through to the Pentagon and the primes. But just like the SBIR program, which is authorized and the GAO has studied over the years and Harvard has reported on the huge contribution it really makes, I think we would see the same thing a few years down the road.

Mr. MCKEON. Thank you very much.

Thank you, Mr. Chairman.

Mr. WELDON. I thank the gentleman. Just one follow up. If you could provide for the record, so I don't put you all on the spot, some other examples of comparisons of what our entrepreneurs have done versus what that same product would cost from a large prime. And you don't have to put any names on it so we don't get any of you in trouble. Give us a white paper list of some examples that we can include in the record. And, again, we won't attribute to any one company so that the primes don't come after you.

Any other questions? We will give you some questions for the record. If you could answer them for us with more time, and we would appreciate you getting back to us so we can put your responses that we have asked for into the record for further discussion by the full committee and by staff. We are definitely going to move on these ideas legislatively, so we want to have the full input of your advice and consent.

We want to thank you for your testimony but more importantly for the great work you are doing under sometimes difficult conditions. This committee wants to be your friend, and sometimes it is hard pushing against the bureaucracy, but we do that well here, so we want to be your advocates.

Thank you all, and you are dismissed, and we will look forward to calling our next panel. Let us take a few moments to set up be-

cause we have so many panelists. In fact, I think the whole audience is a part of the next panel. [Laughter.]

Mr. BRODERICK. Thank you, Mr. Chairman.

Mr. WELDON. Let me acknowledge Jesse Tolleson and Claire Dunne who actually did all the organization for this hearing. They are both very capable staffers on the committee. I want to thank them for their outstanding work. Thank you both.

[Recess.]

Mr. WELDON. Panel two, what we are going to do is have each company make a presentation on their own and then I guess we will bring everyone up at one time, and we will save our questions, I guess, till the end. Is that what you are suggesting Bob? Okay.

We will start with Richard Hollis, president and CEO of Hollis-Eden Pharmaceuticals. The floor is yours. If you can, again, limit your statement. We will put your statement in the record as it is written, but give us the verbal so we can have an interaction as we had with the first panel. The floor is yours.

STATEMENT OF RICHARD HOLLIS, PRESIDENT AND CEO, HOLLIS-EDEN PHARMACEUTICALS

Mr. HOLLIS. Mr. Chairman, Members of the subcommittee, thank you for the opportunity to testify today.

The Armed Forces Radiobiology Research Institute, known as AFRI here in Washington, in 1997 began testing Neumune, the Hollis-Eden drug candidate, as a potential medical countermeasure to a nuclear or radiological attack. Shortly after 9–11, AFRI urged us to develop Neumune for the syndication. They did so based on pre-clinical findings shown here on this chart before you, demonstrating that up to 100 percent of the animals treated with Neumune survived following lethal radiation exposure, while all the untreated animals died.

These results and the fact that early intelligence after 9–11 indicated that al Qaeda had considered nuclear power plants in their list of targets and their obsession to acquire nuclear material made this a priority for AFRI to develop as a medical countermeasure.

In a nuclear attack, the vast majority of the victims would die from radiation sickness, not the actual blast. This chart, based on an article from the New England Journal of Medicine, published in 2002, shows what would happen in New York City if a 10 kiloton device went off. Fifty thousand would die from the blast immediately, and roughly 200,000 would die from radiation sickness, and another 700,000 would get ill from radiation sickness.

So radiation sickness kills and injures by damaging the body's bone marrow, which leads to depletion of white blood cells, known as neutrophils, and clouding elements, called platelets and red blood cells, which are critical for carrying oxygen to tissues. This damage leaves the victim vulnerable to opportunistic infections, bleeding episodes, severe anemia and eventual death.

So our product, Neumune works by boosting the body's immune system, and we believe, as many radiobiology experts in the field believe, that a drug like Neumune is needed to minimize the devastating medical consequences or loss of lives that would result from a nuclear or radiological incident.

There is currently no available drug that can provide this type of protection. These charts show preliminary testing done on non-human primates exposed to doses of radiation. Our product was able to protect these animals. This data is very important because this is the data we are going to be using to get Federal Drug Administration (FDA) approval here in the United States.

Prior to 9–11, Hollis-Eden was focused on other applications and infectious diseases, but we chose to develop Neumune as we shifted the company's focus to developing a nuclear antidote. First, we focused on developing Neumune because we thought it was the right thing to do for our country. This is a medical countermeasure that is necessary. Both President Bush and democratic Presidential candidate Senator Kerry have both stated that this is the Nation's top priority.

So based on these concerns, today we conduct many trials and designs to try to negate the consequences of a nuclear attack, and we have teams of medical professionals drilling to face the casualties numbering in the tens or hundreds of thousands. But the vast majority of these victims, we believe, absent a medical countermeasure like Neumune, there will be little hope for them.

So in these exercises, we prepare to send the National Guard and civil support units and emergency first responders into these scenes to save lives. However, today, we can't adequately protect these brave men and women against radiation exposure. So a critical element in saving their lives in the event of a nuclear attack is through an effective medical countermeasure. In other words, we can conduct all the drills we want, but unless we have a medical countermeasure that is effective and practical, there is not much we can do.

Second, we focused on developing this product because, quite frankly, we couldn't live with ourselves if we didn't develop it in case there was a nuclear attack. We at Hollis-Eden are doing everything we can to get this product to the marketplace, but the decisions to deploy this drug are exclusively in the hands of the Department of Health and Human Services, the Department of Homeland Security and the Pentagon. So these agencies have to determine how they will deploy and buy this drug.

Lastly, and third, we focused on this because it made smart business sense. We can get this drug developed quicker through the animal efficacy rule than we could on a normal development FDA pathway. Unlike most drugs, there is a marketplace, so bioshield today now has created a marketplace for these particular drugs. And today I was privileged to be in the Rose Garden when the President signed the Bioshield legislation, which is intended to rectify the market failure of no market.

So the purpose of Bioshield is really to provide the private sector with the necessary incentives to encourage development in this area. So the promise of Bioshield is really great American legislation that calls on the ingenuity of the private sector to respond to our Nation's call to develop medical countermeasures against weapons of mass destruction. And on analysis, the combination of a purchase contract, defined markets and the expedited approval process made this a wise business decision for us to pursue.

That said, it is taking much too long to get Bioshield legislation passed, as was originally anticipated. That delay and uncertainties about how the program will be implemented is causing the financial community to be skeptical of investing in companies like ours.

A major uncertainty about Bioshield implementation concerns will be how contracts are implemented. So what we would like to have is criteria for Bioshield purchase contracts clearly defined, and these criteria should be based on the impact of weapons of mass destruction, the current scientific intelligence regarding the possibility of the risk, the lack of current treatments and the potential success of new countermeasures and a company's ability to deliver on that promise.

Weapons of mass destruction threats need to be identified, treatments prioritized. For example, it is our view that the nuclear threat, the greatest threat to our Nation, is now lost amongst a plethora of biological threats that are significant but not of the same magnitude as a nuclear 9–11.

I would like to offer Members a sampling of recent reports depicting the nuclear threat and the impact it would have on the United States. These reports are very recent, and I would just quickly like to read a quote from one of these studies titled, "Securing the Bomb," published May 2004, from Harvard University, John F. Kennedy School of Government, commissioned by the Nuclear Threat Initiative.

Beginning a quote, this report debunks in detail a series of myths that have led policy makers around the world to downplay this danger. The facts are the amount of inadequately secured bomb material in the world today is enough to make thousands of nuclear weapons that terrorists are actively seeking to get these materials and that with such material in hand, a capable and well-organized terrorist group plausibly could make, deliver and detonate at least a crude nuclear bomb capable of incinerating the heart of any major city in the world.

In conclusion, we can't expect to win today's unconventional war using conventional weapons and tactics. You can't eliminate a virus with a stealth bomb or an aircraft carrier. A flack vest is of little protection against a nuclear or dirty bomb. However, medical countermeasures can literally take these weapons out of the hands of terrorists.

So the only question is will we take the necessary steps to develop these medical countermeasures now by stimulating the capital markets and the pharmaceutical industry to respond to this Nation's security needs?

So, last, we need the government to fully implement Bioshield and provide the leadership to make this legislation a remarkable success story of government and industry working together to secure our Nation's safety and freedoms against terrorist threats.

Mr. Chairman and Members of the committee, thank you for the opportunity to appear before you.

[The prepared statement of Mr. Hollis can be found in the Appendix on page 70.]

Mr. WELDON. Thank you for your excellent statement. We are going to ask you to sit there, and I am going to ask Tony Mulligan to come up. Tony is the president of Advanced Ceramics Research.

And, Tony, feel free to address the committee. We will accept your statement as a part of the record, and we are going to ask questions after all of you have a chance to make your opening presentation. Tony, the floor is yours.

STATEMENT OF ANTHONY MULLIGAN, PRESIDENT, ADVANCED CERAMICS RESEARCH

Mr. MULLIGAN. Thank you, Mr. Chairman, Ranking Member Abercrombie and members of the committee. It is a great honor to be here.

My name is Anthony Mulligan, and I am the CEO of Advance Ceramics Research of Tucson, Arizona. I am also a former board member to the Small Business Technology Coalition, and I would just like to throw out a plug that I think very highly of the coalition. I think they are very accurate on the needs and viewpoints of the small high-tech companies. I myself was one of the original founders to the coalition eight years ago.

My company, Advanced Ceramics Research, is a successful, small high-tech company. We were originally founded through the support of the Department of Defense and other Federal agencies, primarily the Office of Naval Research (ONR) with Admiral Cohen, and also with DARPA, with Tony Tether, on developing a magnitude of technologies. But, primarily, what I would like to talk about today is our technologies for rapid manufacturing processes.

Under the support of ONR and DARPA, we have developed a number of technologies that enhance the ability of how do you make things cheaper, better, faster, that perform better. Through the SBIR program, we have received multiple manufacturing process technologies, including funding from NAVAIR on SBIR technology, called Water Soluble Tooling. We have had DARPA funding for a technology for Extrusion Free Form manufacturing, and ONR technology called, Solid Free Form manufacturing.

What I would like to do is show you some example of these technologies. First, I want to do a demonstration, and I am going to show you how one of the core technologies works, and then I will show you the kinds of parts that can be made from it.

The water soluble technology, developed on our Naval Air System Command (NAVAIR) funding, which is a phase II program that is now going to a phase III, is a material that looks like these cubes. And you can form it and shape it however you want, and then you use it to make the tool or the mold and you put your composite material around it and then you can cure that in the oven or fabricate it. And then with simple water, I have some drinking water here, these tools, which are pretty hard and strong, in most cases, Mr. Chairman——

Mr. WELDON. Is that a slap at the chairman, Tony? [Laughter.]

Mr. MULLIGAN. I didn't mean that, sir. And so now I have poured the water in, and now it has just turned to a horrible slush.

And what do you do with this? Well, one, another aspect is it is very green. The materials are made out of materials that the FDA has approved for food packaging. Examples of things that you can make, this is a wing section on the NAVAIR programs which was made in one piece that has ribbed sections built into it, stiffeners, strengtheners, and it even has a global positioning system (GPS)

antenna. And so this was made in one piece, and what we believe is we can build an entire unmanned aerial vehicle (UAV) using this technology in one piece. And then when you have fabricated your part, your whole part, you wash away everything inside, and then you are left with your final component.

This technology, combined with the other manufacturing technologies, we believe, also would let you build things like torpedoes and unmanned underwater vehicles (UUVs) and even missile casings, complex-shaped parts in one single component, greatly reducing the cost affiliated with all the individual pieces that have to be fastened together and attached. And it also lets you make parts that are much stronger and much more reliable.

Another defense example is this is a component that connects to the T-valve that connects three different lines, and it is made with a water soluble tool where the composites are wrapped around it. It is cooked in the furnace, and then you wash it out and you are left with a part that looks like this that would have previously required three tools to make.

What does this mean dollar-wise? We built one part for a defense contractor, a large inconel steel tooling part—it is a large rocket motor part that would have normally required a large inconel steel tooling. Using this process, our entire cost——

Mr. WELDON. I couldn't hear what you said. It requires a what kind of——

Mr. MULLIGAN. It would require steel or metal tools to fabricate the part. Using this process, our total cost was about $15,000. The large defense prime, they told us afterwards that if they had used their conventional manufacturing methods, it would have cost them nearly $1 million to make that part.

Then in another case of a Navy aircraft component part, we took tooling that had cost $150,000 to produce the part, and with only $5,000 we were able to produce tooling using this method that could make parts that were of the same quality as the parts that were made with the metal tooling.

Another example of what you can do with the technology is because it works off whatever you draw in the computer, you generate a part, this is an artificial bone component, and it is a process we call PlastiBone. And what happens is if you are—and this funded by ONR—but if you are a soldier and your right arm has taken an injury where it has been blown up, we CAT scan your left arm and superimpose that over what is left on your right arm. The computer image then generates a computer image of that, and the machine fabricates, directly fabricates the bone segment that you are missing.

The material that is used in there is a calcium triphosphate with a polymethylmethacrylate compound that basically is bone food. And what happens is your bone will start growing into this, and then after a few months you can take your cast off and use your arm. In a period of a year to a year and a half, you now have all natural bone. Your bone will have grown through and eaten the entire scaffolding and you are left with a solid bone segment. The parts are very accurate. It will generate it to within a few thousandths of an inch of what the actual size is.

The same technology in another application, this is a hydrogen scramjet injector for a hydrogen motor, and the previous way it was made is many thousands of sheets of copper foil diffusion-bonded together and then cooked in a furnace and costing sometimes, the first products, hundreds of thousands of dollars. Using this technology, we are able to build these high-temperature ceramic components where hydrogen fuel comes in one end, goes through complex channels inside, and comes out in a very specific way so that it can work correctly in the motor.

In another application, we have a mold here off the corner of the table, which is a heart valve mold, which allows the people who build artificial hearts to make a much better assembly that doesn't fall apart. Every now and then they have had problems where the casings would separate. Now this cures that problem.

And then in yet a third application, showing the versatility of this capability, this is what you might recognize as the face plate of a cell phone. Our material is used for these handles that hold these cell phone plates because of its low-cost function to allow an operator to hold it so they can polish the cell phone. Oddly enough, what this has resulted in is the very large company that we sell these to has been able to maintain their workforce here in the U.S. instead of shipping abroad for low-cost labor, simply because it is a low-cost tooling and the versatility of this material that they have access to.

On the far end over here, I would like to show you, this is the mold that was cast out of silicone. Its value is only a couple dollars in raw materials. It has been damaged several times before today. No one has a monopoly. And, in general, you would wet the pieces if you broke it and you would stick it back together, and half an hour or an hour later it will be strong. So if you damage your tool, you can repair your tool.

But on this picture we have on the easel here, what they made from this, and it is in production in Europe, is a one-piece carbon fiber wheel that has hollow spokes, has a hollow hub, and the wheel is about a third the weight of its competition, yet it is much stronger and it demonstrates how you can build very complex parts very inexpensively, opening the doors for a lot of opportunities and what the Department of Defense needs.

The last part I would like to show is this is a small ceramic piston and cylinder, which is manufactured on one of our manufacturing plants on the Tohono O'odom Reservation in Tucson, Arizona. And these parts were made also using the same processing, with the ability where you use water soluble tooling to cast the parts, it uses a computer-generated placement of that tooling, and except for a final machining operation, it is pretty much a near net-shaped part. And what this does at very low cost, actually a lower cost than the metal component, allows small UAV engines to operate with heavy fuel, such as diesel fuel or JP–8 fuel, which is important for our war fighters.

The last sample, this very last sample is a metal component which can actually be made directly from the tooling material. So you make your part out of the water soluble tooling directly generated from the computer, so you don't actually have to use hands, and then you can place the material, and here's a large nickel

chrome part. And then you just wash away the tooling and you are left with a metal part. Before you would have to had to take a sheet of metal, had very head-duty steel tooling that would stamp these parts out, and then you would have your part. With this process, it is very simple and very low cost.

So in closing, what I would like to say is our company, Advanced Ceramics Research, is just one of many, many small businesses that do amazing things, that do these types of things, and they are succeeding because of the congressionally mandated SBIR program.

I believe Congress established the SBIR program because it recognizes that small businesses create most of the new jobs, and they are the source for most innovation, as we have heard today from the others who have been on the panel. This is because small businesses are not risk adverse. Basically, we have no choice. We have to take risks. It is the only way we can survive in order to stay competitive in today's climate.

Our current times demand that the Department of Defense be willing to take more risk by investing in small businesses. I believe that the members of this subcommittee can assist the Department of Defense by providing adequate support personnel to the offices administering the SBIR funds, encouraging the expanded use of the deliverable and definite quantity contracts for small business innovative research programs and remove the disincentives which defer the acquisition community from dealing with small businesses.

Specifically, my last comment I would like to make is if a program officer picks a large prime and the project fails, that is okay, but if the program officer picks a small company, that could easily be a career-limiting move. And if the company succeeds, he gets a nice pat on the back. If the company fails, it may have a great effect on this career for the future. So it is very difficult for the regular program manager out there to take the chance and move forward with small businesses.

Thank you for the opportunity to talk here today.

[The prepared statement of Mr. Mulligan can be found in the Appendix on page 82.]

Mr. WELDON. Thank you, Mr. Mulligan. That was outstanding testimony and outstanding products. If you would sit there, our third witness is Mr. Enrique Enriquez, president of Locust USA, Incorporated.

We are pleased to have you here, Enrique, all the way up from Florida. Welcome, and the floor is yours. We will enter your statement as part of the record.

STATEMENT OF ENRIQUE ENRIQUEZ, PRESIDENT, LOCUST USA, INC.

Mr. ENRIQUEZ. Thank you, Mr. Chairman, Ranking Member and Members of the committee. It is an honor to be here. I am going to give this my best shot. Can you hear me there? Okay.

Over the past 20 years, I was head of engineering development for Rolls Royce in Miami. We worked in very advanced programs like Star Wars, and I had the honor of being a project manager and making the structures for it. During my career, I have come across wonderful people that we used to talk about the potential of UAVs

in the future in automation, and we were just waiting for the days when computers would come to the position that you can put it inside a small plane and fly it.

I want to talk a little bit about my company, Locust USA, which is a combination of two companies, basically: Pegasus Engineering in June Beach, which is made of retired Pratt & Whitney top-level engineers. These are the people that have built and designed the engines that we are flying today in commercial and also military. And a little company in Miami called Mark Two Engineering, which is a leading manufacturer of biomedical equipment that we double in doing the prototypes for the UAV engines that we are presently manufacturing for DARPA and the Army.

I guess that the real point that I want to make here is that one thing that I have been very fortunate to take advantage of is that I have found a tremendous amount of talent of retired people out there that I have been able to bring together. These are retired folks from Pratt & Whitney, Sikorsky, and they are developing the same quality of products that they were doing for all their life, except that we are doing it in a very low-cost fashion.

I just want to give a real quick example. We are developing a little engine for DARPA that is going to produce roughly about 4 kilowatts of power. And this is the motor. This is the little thing that makes about 4 kilowatts power. This is enough power to possibly be a backup to most homes. So the technology that is being developed will weigh approximately 10 pounds. In existing technology, what you have out there in the field today weighs hundreds of pounds. So, in essence, what we are doing is we are lightening the force for our armed forces, and I think I opened questions.

I think this technology has an incredible amount of potential. You can find it in UAVs, you can find it in power generation, it can power cars, it can power a lot of things. It is going to open many, many avenues. I think it is as revolutionary as the personal computer was 20 years ago. So I encourage this committee to find small companies and especially those that revive that wonderful talent that is retired out there that is completely capable of doing great things all over again.

[The prepared statement of Mr. Enriquez can be found in the Appendix on page 85.]

Mr. WELDON. Thank you. We have some questions for you but we are going to ask you to sit there until we get the others up. Outstanding work, Enrique, and I appreciate seeing you again. You were here once before we met. I was impressed then, I am impressed now.

Mr. ENRIQUEZ. Thank you, Mr. Chairman.

Mr. WELDON. Our next witness is Tom Cuda, vice president of Operations for Vista Controls. Tom, if you would come forward and give us your statement. Welcome, it is good to have you here.

STATEMENT OF TOM CUDA, VICE PRESIDENT OF OPERATIONS, VISTA CONTROLS, INC.

Mr. CUDA. Thank you. We are working on the signal.

Mr. WELDON. I promise, Tom, I didn't touch your system before the hearing started. Neil may have, though.

Mr. CUDA. There we go. Thank you. Mr. Chairman, Congressman McKeon and other committee Members, thank you for inviting me here today. My name is Tom Cuda. I am vice president of Operations at Vista Controls, Incorporated, a Curtis-Wright company. I am here today to talk about the advantages of using commercial off-the-shelf products, also called COTS products.

Vista Controls is a DOD small business success story. We were founded in 1985 in a Santa Clarita, California garage. Today, we have two facilities: A 52,000 square foot facility in Santa Clarita, California and a similar facility in Littleton, Massachusetts, with a total of 250 employees. Vista Controls was acquired by Curtis-Wright Controls in November 2001. At Curtis-Wright, we are proud in our company's history with roots back to Kitty Hawk and man's first powered flight.

We specialize in providing boards and systems based on rugged commercial off-the-shelf, open architecture electronics. Since Vista's start-up in the founder's garage in 1985, we have provided COTS products that are deployed in a number of military platforms. COTS saves money by fostering competition and reducing life-cycle costs. It reduces development of risk and time to market. It provides economical technology insertion capability, and our COTS products are built specifically to meet the rugged high-reliability requirements of the defense industry and have been a success for both DOD and the war fighter.

COTS in motion. On the right hand side of the screen, there are two very short videos. The first one is a low-sat system in action, and the second one is a striker mobile gun system, both successfully developed with COTS content.

Industry and government agree the COTS business model works. The COTS business mode works because market pressures compel economically rational decisions, resulting in constant innovation and little waste. Open market success brings competition and lower prices, and a competitive market creates broader choice. A commercial developer is motivated to minimize costs and shorten development cycles.

COTS works across multiple surface platforms. Development costs are spread across all the users. One single board computer, as indicated on this screen, can apply to many applications. Vista Controls' R&D funded single board computer services ground mobile, sea and air platforms. Open standards-based architectures allow faster, lower-cost technology insertion.

COTS represents a solution for electronic component obsolescence. We manage obsolescence levels, designing long life into our products and providing modular, upgradable products. We address obsolescence at the component board subsystem, managed systems level. We use commercial technologies to develop rugged, reliable building blocks, as demonstrated by our product content on the Global Hawk Program.

Our COTS products include a perimeter intrusion detection system for protecting the war fighter at home and abroad. We called it QUPID. QUPID stands for Quick-Reaction Perimeter Intrusion Detection system. QUPID is a unique beyond-the-fence perimeter system that looks beyond the defensive perimeter, allows for early warning before the attack, keeps the threat away from the asset,

inexpensive, uses an ultra wideband radar system. It is currently deployed at U.S. Air Force facilities.

What I want to leave here today is that Vista's COTS products have been successfully deployed on many military platforms, and COTS is a good answer, a good solution for both government and industry, from Kitty Hawk to Global Hawk.

Thank you again for inviting me here today.

[The prepared statement of Mr. Cuda can be found in the Appendix on page 105.]

Mr. WELDON. Thank you, Tom, for that great presentation and for your great technology overview.

We would ask you to sit there as we invite Greg Peterson, chairman and CEO of SecuriMetrics, up to make a presentation on behalf of his company.

Greg, welcome. Your statement will be entered into the record. Feel free to make whatever comments you would like or show whatever demonstration you have.

STATEMENT OF GREG PETERSON, CHAIRMAN AND CEO, SECURIMETRICS, INC.

Mr. PETERSON. Chairman Weldon——

Mr. WELDON. You have to pull that mike up close, Greg. That is good.

Mr. PETERSON. Can you hear me now?

Mr. WELDON. No. It must not be on.

Mr. PETERSON. There we go. Chairman Weldon, Ranking Member Abercrombie and Members of the subcommittee, good afternoon. My name is Greg Peterson. I am the CEO of SecuriMetrics, Incorporated, and I consider this opportunity to testify before the committee a great honor, and I thank you for inviting me.

SecuriMetrics is a small business located in Martinez, California, and we employ 16 highly trained professional hardware-software engineers and program managers. We are going to be increasing our size of the company to 25 people very shortly, primarily due to a contract that we signed just a couple of weeks ago with a government agency. I will be addressing that a little bit later.

Our general area of business is biometrics, which is the process of identifying a person by some physical characteristics. Our primary focus is in iris recognition and most particularly in portable iris recognition. This device right here is the only one of its kind in the world. It is a full XA6 computer and storage system and can hold the iris templates for a quarter of a million people and search them in a matter of seconds for positive identification.

The scope of our expertise runs directly toward portability. This device here to my left is a multi-modal system, which incorporates this device, the PIER, Portable Iris Enrollment Recognition system, as well as a fingerprint recognition system and a face recognition system. This iris portion is our personal technology. We have used third-party technology for the other two modalities and combined them into this portable system.

A prime area of focus for us currently is supplying hardware and software to the U.S. military. This is partly because of the support and interest the military has shown to our company. A couple of years ago, we were discussing our plans to be building this portable device with the battle command, Battle Lab at Fort Huachuca, Ari-

zona. And the lab said they were quite interested in using this technology if we could just form factor it differently for them so it would fit into a cargo pocket of a soldier's uniform.

We did so and sold them a number of units that we redeveloped in about three months, and since that time this unit is now in Afghanistan, Pakistan, Bosnia, Cuba, Iraq and with special forces and with other sensitive applications in the field. We are continuing to sell units to the military and different agencies and have had a virtually flawless experience in the field with it.

Over the past five years, our company spent almost all of our time and our internal funding to develop these products, and, as I said a couple weeks ago, we received a contract that was sponsored by the military and extended by a consortium of other government agencies. And the interest that they are showing is in taking this multiple system here and bringing it down to near the size of this portable system that we have done for ours alone.

The project is a one-year project. We believe that we will finish development, based on our history of the PIER development, in probably nine months. At that time, that system, we believe, will be deployed worldwide.

If you would like, Mr. Chairman, I can do a very quick demonstration of how this system works. I have a victim in the audience here. Where did he go? He is hiding. Mr. Thompson.

Mr. WELDON. Mr. Thompson. He is well known to the committee. But do his eyes work? I mean we often wonder. If eyes are okay to work?

Mr. PETERSON. Well, he is suspicious.

Mr. WELDON. Okay.

Mr. PETERSON. We enrolled him in a system, it takes only a few moments, previously, and now we are going to—using the device, we will take a digital photograph of his eye, and he was identified absolutely in that amount of time. There is a small database unit at this time that, as I said, it can go up to a quarter of a million individuals, and its speed would be only a few seconds slower than you saw.

The multi-modal system——

Mr. WELDON. It says known criminal on all post office walls. [Laughter.]

Mr. PETERSON. Should I go forward?

Mr. WELDON. Yes. Go right ahead.

Mr. PETERSON. The contract that we just signed originated in the Fiscal Year 2004 Department of Defense Appropriations Act, and some funding was given to us through our sponsor at the Battle Lab, and additional funds were offered through a consortium of other agencies. We recently heard, actually I heard just before this meeting started that in the Fiscal Year 2005 Defense Appropriations Act we are once again granted funding to take this system into full deployment.

We are very grateful for the interest of the military, the U.S. military. We believe that our success is directly due to the government's interest, and it has helped us to launch this company. For five years, it was a fairly lonely process. Again, like many prototypical hardware and software technology companies, this company started in a spare bedroom in our house and taxed the

forbearance of my lovely wife for many years as I depleted our personal funds to zero and kept the company alive, and we were literally saved by the interest of the government to let us go forward.

When I found the company five years ago, I never dreamt that our products would be of potential help even in a small way in securing the safety of our troops or of our country. The possibility that this is true is, to me, one of the most gratifying parts of my career and is and will always be I think one of the highlights of my life.

Mr. Chairman, Ranking Member Abercrombie, Members of the committee, thank you for this opportunity.

[The prepared statement of Mr. Peterson can be found in the Appendix on page 89.]

Mr. WELDON. Thank you, Greg, and we appreciate your outstanding presentation. And I see Steve over here. Steve is a former committee professional staff member. You have very capable representation. He is excellent, an excellent person. So thank you for being here.

Our next witness, if you would stay at the table, please, is Dr. Alexander Stoyen, chief executive officer of 21st Century Systems, Incorporated.

Welcome, Dr. Stoyen. Again, we will accept your statement for the record, and you make whatever verbal comments you would like.

STATEMENT OF ALEXANDER STOYEN, FOUNDER AND CEO, 21ST CENTURY SYSTEMS, INC.

Dr. STOYEN. Thank you very much, Mr. Chairman and, of course, Mr. Ranking Member, Members of the subcommittee. I will do my best. I am the last speaker without any props. I apologize.

Mr. Chairman, I would like to reflect on some of the experiences of 21st Century Systems as a small business, innovative research, active participant and as a Navy SBIR program success story. We have 100 percent commercialization index across the programs that we do, and every one of our phase II SBIRs has gone to phase III in the Department of the Navy.

Twenty-first Century Systems builds decision support technology. Let me just explain very, very briefly. I have some screen captures in my written testimony to illustrate, but in a nutshell it has been known for a long time some of the limitations of computer software acting alone in an automated fashion. There are some theoretical limits that are well known to us in computer science.

It has also been well known that there are limits on human cognition and human ability to make decisions, and some of these limits, of course, have prevented perhaps better command and control executions under time-critical and mission-critical constraints with floods of data from multiple sources, overwhelming the war fighter within a command and control situation.

So what 21st Century Systems has done is develop intelligent, proactive software, which both fuses scales, interprets the massive amount of data which comes in from various sources and then intelligently prioritizes and delivers in a timely manner to the war fighter and acts in an assistive capacity; that is, the software intelligently interacts, presents possible courses of action, provides a ra-

tionale why to follow a particular course of action and then pays close attention to how the war fighter is reacting.

And this technology, Mr. Chairman, is very adaptable, generic and scaleable. We have applied it in a great number of mission areas. It has been used in a number of DOD programs, ranging from the dismounted foot soldier and force protection type of mission areas, to command and control aboard Navy ships and submarines, to space control and other areas, as well as intelligence.

Now, just to say a few more words about our technology, in general, it is useful to do technology that is very scaleable and can be applied in great many areas. One of the things that we believe very strongly in information technology that you build a generic set of tools, components, sole source components once and then you extend it and you apply it to as many areas as possible. And one of the broader issues that we have with the way some of the information technology contracts have gone there has been a proliferation of stovepipes, very expensive one-time solutions which to me defy what information technology is all about.

Information technology, to me, as a former member of IBM research staff and having gone through successful career in academia and now running a small business, I believe IT innovation firms should be small. They should never get too large, in my mind, because then they are really doing technical services, not software innovation anymore. That is what my firm believes.

Now, just to reflect a little bit on the small business innovative research, one of the examples that we have of a great success story in the small business innovative research is our work with the submarine fleet on the Consolidated Undersea Situational Awareness System. This is work that has been strongly advocated by submarine force specifics out of Pearl Harbor.

And this is a tool which looks at information which really comes in very sketchy. They have a lot of data coming in, it is highly uncertain, highly hard to interpret. Either full automated interpretation or human interpretations is often faulty, time-consuming, error-prone, but working together, software and humans, much better aboard the submarines. And that is a great program. And that is a phase III effort through the Department of the Navy.

I would like to give a lot of credit, first of all, to the Office of Naval Research and the Navy Small Business Innovative Research Program, which has been at the forefront. Now, we have SBIR phase IIIs with other departments of the DOD, but the Navy is clearly the forefront, as has been stated by some of the other speakers. We work with other services as well. I believe they are catching up. Hopefully, one day this will work across services very, very well.

One of the observations that I think may be useful to the subcommittee and the full committee is that the Office of Naval Research made it a priority to work with the Navy acquisition commands, such as the Naval Sea Systems Command (NAVSEA), and others, and so they have fostered that relationship between ONR and the program executive officers (PEOs), at NAVSEA and the position commands, and we have been a huge beneficiary of this work, and that is why everything we do with the Department of

the Navy does go to phase III, every single project that we have done.

I think the SBIR program, looking at it again broader and with the benefit of the program, I think it accomplishes a number of things very, very positive for the American economy and not only those of us in the business community but those in academia and of course from the government, and for us, the fighting men and women in uniform are the end user of what we do, so that is extremely important.

The SBIR program is by far the fastest, least expensive and most effective way to bring technology from inception, conceptualization, to product type system and into the hands of the end user. As the subcommittee undoubtedly knows, it takes two to four to six years to form a major acquisition program in the Department of Defense, and then they are two to four to six years out funding it.

Well, that works very well if you are building hulls and propulsion and things of that nature, air frames. It does not really work well in information technology. One of my recommendations, just based on our own experience, is for the subcommittee and the committee to perhaps facilitate further acceleration of this process for technology that cannot wait two to four to six years, such as information technology.

Another observation is that information technology, by far and large, if it is appropriately managed, does not have to be very expensive. One should not mistaken innovation and software products, COTS and otherwise, with technical services. It is very easy to take a perfectly inexpensive, well-working software system and load it with hundreds and hundreds of people where the only purpose, frankly, is to drive the cost up, because the innovative technology is already delivered into the hands of the end user.

So these would be the two sort of broad remarks. Not being an expert in procurement and acquisitions, it is hard for me to navigate that jungle, but I think whatever you can do to simplify the process and tell them what I have just said and others have said today.

I think your committee, to me, is doing an exceptional job, not only keeping the SBIR at the forefront of our innovative community everywhere, small business, large business, academia, but also making it a priority that it be run directly—that the dollars be actually spent as intended.

The committee knows that the two words—everyone understands small business, but there are also the words, "innovation and research." And it is very important, again, I stress, not to mistaken that with technical services and some of the later piles of money that do get spent and will predominantly be spent on the larger integrated companies irregardless.

I think as far as the RDT&E, the bulk of the innovation comes from small businesses today. I am former IBM research, I was in academia, and I know how many of us left to form small businesses. And that I cannot stress enough.

I would like to thank the committee for doing an outstanding job, and I am available for any questions. Thank you so much for inviting me. I am honored.

[The prepared statement of Mr. Stoyen can be found in the Appendix on page 92.]

Mr. WELDON. Thank you, Dr. Stoyen, for your outstanding presentation. Our final witness, if you all will stay at the table, is Mr. Charles Harper, the executive chairman of Sierra Monolithics.

Charles, we welcome you, and your statement, again, will be entered in the record, and feel free to make whatever verbal comments you would like to make. And following this we will attempt to do some questions, although we expect a series of votes at five, so we will go and ask questions until then, and then we will go vote, and we will allow you all to intermingle and the audience can also come up and ask you questions or whatever. But we will have a series of votes at approximately 5 p.m., so we will have to leave, it looks like, at approximately 5:10 to go over to do a series of votes on the house floor.

Mr. Harper, the floor is yours.

STATEMENT OF CHARLES HARPER, EXECUTICE CHAIRMAN, SIERRA MONOLITHICS

Mr. HARPER. Mr. Chairman, Congressman McKeon and other Members of the subcommittee, thank you for allowing me to come and tell you this story of Sierra Monolithics. These little devices here I will tell you a little bit about in a few minutes, but a little bit of story of Sierra Monolithics.

We are located in Redondo Beach, California. I started the company in 1987, two of us did, and then we also form an 8(a) company, and currently today we are a venture-backed firm. We have 2 venture capitalists that we raised over the last 4 or 3 years about $30 million. We also have a strategic partner investment from IBM as well. We have got permanently two product lines, one would be aerospace defense where we are supplying data links, UAV data links, millimeter wave transceivers.

We also have what is considered a commercial integrated circuit product line. And the integrated circuit product line is one that we are looking at eventually to allow us an opportunity to initial public offering (IPO) and become a public company. Obviously, most businesses when you start out the way we have started off, you would like to start off and grow your business and have a going concern and eventually become a public company. And that is what the intent is today.

But the way we have actually started in some of the commercial activities that we are doing, primarily the WiMAX transceivers, we are one of the leading companies I think in the world in the WiMAX transceiver area. We are developing automotive radar integrated circuits (ICs), satellite receiver ICs as well.

But the expensive technology, actually, when we started out in 1987 actually came from the SBIR program. So we actually started off with SBIR. For 10 years we were quite heavily involved in this.

When I came out of Magnavox, the research labs and went out to determine starting this business, I went to the same agencies that I was at Magnavox. And when you went in there—and I went to the Air Force Wright-Patterson Lab and the Naval research labs, and once you walked in there, they kind of looked at you as if you would left your complete brain at Magnavox. And so that was one of the first times that I became kind of afraid, "What am I doing?"

So we reverted to something that was tried and true, which was an SBIR program. Although there were competitive, what we ended up doing is in the 10 years we won 10 phase Is, 6 phase IIs, and only won 1 phase III. And the agency for the phase III was United States Special Operations Command (SOCOM), and one of the interesting things about SOCOM, which was a little bit different than the other SBIRs, there was actually a transition from phase I to phase III. And a lot of the other SBIRs that we had you went through phase I, phase II, and the potential for phase III was very, very difficult. But here there was a transition.

And this is TPN–19 beacon. This was what we were supposed to do as part of our SBIR program to develop the next generation. So this is the base unit here, and this is the battery. So now the battery looks like this, and that is the unit there. So what we have done is taken technology here, and this is an IDIQ contract, phase III at SOCOM, and what this is used for currently is for some dropping for offset bombing.

But what we are finding now is a lot of the troops are actually using this as a counterfracticide device. And so what we ended up also doing as part of a phase I, we actually ended up developing an X band—this is a dual band—an X–band and KU band.

And the way this thing works is if it gets interrogated by an aircraft, an F–15, F–16, AC–130's, gun ships, it will interrogate this in sleep mode and then it will respond. But this is an X-band, that is an X-band and KU-band because the V–22 was also a KU-band as well as the links radar is at KU band as well.

But this is an X-band version that is quite—and so we ended up doing this one in phase I. We actually did this in phase I, delivered an X-band version then in phase II that we delivered this one. We have actually shipped, of both versions of these, somewhere in the neighborhood of about 1,400 to 1,500 of these.

And now what is happening currently we are actually getting phone calls kind of on a weekly or every few week basis from the Marine Corps, from the Air National Guard wanting to have some of these, because they have been training with the Special Ops and going out in the field. In the zone, in certain war zones, they would like to carry these with them. And so some of the troops have indicated, they call this like American Express—they don't want to leave home without it.

And so we have been—the unfortunate part about it is that we actually end up developing this under an SBIR, but getting onesies and twosies is kind of hard as a business, as a going concern to have a flow of manufacturing. And so being an SBIR phase III and an IDIQ contract, although it is the feeling on our IDIQ contract it is somewhere in the neighborhood of 18 million, and we have actually shipped those now for about 15 months. And, actually, over 15—about 18 months, we have shipped somewhere in the neighborhood of 6 million product.

Currently, the Guard has a requirement for about 130 of these, but I think they have got funding for roughly about 50. SOCOM has an unfunded requirement also for roughly about 336 of these, but the total requirement's somewhere in the neighborhood of about 900.

If you think about technology and we are really a technology firm, so where do you end up from these products, going from this product to this product? The next product we are looking at is a little bit smaller than that product there. And then where do you really go where really technology really forwards it? And as part of our integrated circuit technology, we are able to, as you can see, this little chip set will actually end up replacing this whole box here eventually with a little small integrated circuit.

And that is where the technology is really going to move, and we are considered one of the top companies in the world—this is a silicone germanium technology which IBM is at the forefront of this, and so we are designing circuits in this technology.

So what this does is affords one to be able to potentially put these on individual troops, being able to track individual troops and the like. So this is really for counterfracticide this is one of the products that exist today. And we are, as a small business, currently in manufacturing.

The only concerns, again, is, as we talked about earlier, for an IDIQ phase III funding, it is funding, the funding has to come from the particular agencies, and the agencies, to a large degree, as you know, in the global war on terrorism, the companies that are being impacted—I mean my company is being impacted now because we are trying to—you have got a product line that is set up that is manufacturing these, but in the past there has been year-end funds available to procure some of these things, but now we are finding it very, very difficult.

But that is kind of to give you an idea on the kind of things that we are doing and some of the technology that we are doing on both the aerospace side as well as applying the commercial technology that would be also used there.

But, again, I wanted to thank you for allowing me the opportunity to present to you today. Thank you.

[The prepared statement of Mr. Harper can be found in the Appendix on page 102.]

Mr. WELDON. Thank you, Mr. Harper, for your presentation and for the excellent work you are doing.

Well, I think, as my colleagues and I can see, the work you are doing is really unbelievable, and this is just a small sampling of what is happening nationwide and all the more reason why we in the Congress have to continue to do what we have been doing and that is to push this SBIR process and to correct whatever needs to be done to allow it to even be more successful.

Your technologies not only are helping our military by giving us faster, cheaper, more versatile capabilities, but in almost every case, you have a dual-use capability for the technology that can assist us in solving the other problems that we have as a people, and that is just amazing.

I want to move to my colleagues for questions anticipating votes, and then I will come back. So I will go to Mr. Abercrombie first for any statement or questions he might have.

Mr. ABERCROMBIE. Mr. Harper, let me go back to you. You said you formed—did you say you formed yourself as an 8(a)?

Mr. HARPER. Yes. Actually, we started out as an 8(a) company in 1989, and we spent nine years as an 8(a) company.

Mr. ABERCROMBIE.What would you think—and anybody else can—are the rest of you familiar with the 8(a) concept? Okay. Any of you 8(a) programs?

Yes, Mr. Cuda?

Mr. CUDA. For about two years, we were a minority woman-owned company.

Mr. ABERCROMBIE. Okay. My thought here is—and you don't need to comment in detail—but we asked the first panel about submitting to us possible suggestions—I think we are going to get hit right now with this vote. Would it be useful for us to develop legislation to try to implement an 8(a) program, not something to mimic it but along what the 8(a) was set out to accomplish for innovation and research? Do you have a reaction? We want to go to phase III SBIR, but would it be useful for us to look at the idea of developing an 8(a) program for research?

Mr. HARPER. I think that would be actually a very good idea.

Mr. ABERCROMBIE. I am not sure how to do it. It is just an idea that I have.

Mr. HARPER. Well, one of the critical issues in case in point with us is at least with the—is the funding for phase IIIs. I mean with the IDIQ concept——

Mr. ABERCROMBIE. Excuse me for interrupting here because our time is so short, just if you don't think it is off the wall, then think about it and submit any ideas you have to the chairman. What I am thinking about here primarily when I say the 8(a) is a way—see, we have the 8(a) program. There are certain things when the Defense Department has to go to an 8(a) entity, and they get preference, really, in that regard.

And what I am thinking here is is there a way for us to take entrepreneurial research and development and make it mandatory for those companies to be considered when certain specifications come up, vis-a-vis everything from individual force protection to Harper spectra work to the work that Dr. Stoyen's doing, which I am most familiar, those kinds of things? That is my—not my question but that is what I am putting out to you folks. If you can get back to the chairman with that and think about it, would you?

And then perhaps using your own experiences see if you were writing legislation for us—this is my bottom line question—if you were being asked and you are being asked, to suggest legislative approaches that we could use the 8(a) concept for research and development, how would you do that, what would you suggest to us?

Okay, Mr. Chairman? Is that all right? That is the principal thing I want to bring up in this short period.

Mr. WELDON. Absolutely. I thank the distinguished gentleman.

I would turn now to Mr. Cooper for any questions or comments.

Mr. COOPER. Thank you, Mr. Chairman. The technologies are truly fascinating. It is amazing what individual genius can come up with in a small business context. I would like to broaden my colleague, Mr. Abercrombie's, question and help us understand what bureaucratic barriers we need to knock down, whether it is in the Pentagon or other Federal agencies. Because on the one hand, the government has done well with the SBIR program to encourage innovation, but it seems like it is hard to get some of the technology commercialized.

So if you could just help us in specific terms understand what barriers you have run up against that we could knock down, we would love to try to help you knock them down.

Thank you, Mr. Chairman.

Mr. ABERCROMBIE. Would the gentleman yield?

Mr. COOPER. I would be delighted.

Mr. ABERCROMBIE. Yes. Following up on that, if you heard the first panel, and I think the chairman asked, and I think I reiterated or hope I did anyway, we asked them to come up with ideas about are there problems here with bundling or consolidation of contracts, the way in which procurement is handled right now that need to be addressed? Is it the contract officer idea, does that need to be taken a look at in terms of how we can have some innovation there on that side? So if you could follow up on the questions to the first panel in conjunction with what Mr. Cooper's just said, I think that would be useful, Mr. Chairman.

Mr. WELDON. Absolutely. I want to thank all of you for coming in and my colleagues for sticking through this entire——

Mr. ABERCROMBIE. Excuse me, Mr. Chairman. In other words, can you do our work for us? [Laughter.]

Mr. WELDON. And thank the Members for sticking around. We have a very busy day today as we end the session this week for a month or seven weeks, and members are pulled all over. I apologize for not having more members here.

But the message that we heard loud and clear today will get out, not only among the subcommittee but among the full committee, and I can guarantee you that your testimony will result in legislative action since the Congress writes the laws that govern the programs. We will in fact put together a package that will be ready for probably the next session of Congress beginning in January and beginning of our markup with the defense authorization bill.

As we did with the first panel, and as Neil has said, any suggestion you have that were not in your written statement you need to get to us. The record is open for how many days, Bob? A couple of weeks. You have a couple of weeks to get your information back to us before the record is closed so that we have copies of your information on the record for our colleagues to read and share.

Truly, you are doing amazing work, and we appreciate that, and you can tell by the tone of this committee that we are committed to expand the opportunity that all of you are taking advantage of to entrepreneurs like you all across America. The future of our ability to control the defense budget with limited resources and increasing demand lies in people like yourselves and your ability to continue the entrepreneurial spirit that you all exemplify.

So I want to thank you all. I want to thank Bob Lautrup who put the whole subcommittee hearing together. Bob is outstanding and is just a very dynamic leader. I want to thank the minority for cooperating with us, Mr. Natter, for your support in this effort and let you all know that your testimony will have a direct impact on the way this program is developed and modified for the next fiscal year by us here on the committee.

So thank you. You all can feel free to mingle. We apologize but we have a series of votes. We will be gone for a while, so this hearing stands adjourned.

[Whereupon, at 5:09 p.m., the subcommittee was adjourned.]

APPENDIX

JULY 21, 2004

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

JULY 21, 2004

Statement of the Honorable Curt Weldon
Chairman, Subcommittee on Tactical Air and Land Forces

Small Business Innovation and Technology

July 21, 2004

The hearing will come to order.

This morning, the Tactical Air and Land Forces Subcommittee will receive testimony from a series of small, innovative U.S. companies that are developing leading edge technologies, and proposing military applications of those technologies that address a variety of defense modernization needs. The work of these companies will demonstrate to members of the subcommittee that small businesses are capable of producing vital defense products rapidly, at potentially lower costs, and in some cases providing new capabilities. In the new defense era, it has become imperative that small, innovative companies are afforded

adequate opportunity to make their innovations available to the defense acquisition system.

The Department of Defense, in light of the events of September 11, 2001, has elevated efforts to transform our armed forces to meet the nation's needs in the century ahead. Many have concluded that this transformation will depend, in large part, on making better use of innovative technologies being generated throughout the private sector, including both defense and non-defense companies.

Meanwhile, the defense industry has experienced its own transformation over the last decade, and one of the unfortunate consequences of the numerous mergers and consolidations is the continued consolidation and disturbing shrinkage of the innovative research and development base within those remaining companies. Our witnesses today will demonstrate that small companies are often capable of producing leading-edge technologies that offer great advantages for defense programs. However, companies not already part of the recognized defense industrial base often

experience difficulty penetrating defense markets and dealing with the complex regulations and procedures that are required by the Department of Defense.

Each of you here today have experiences relating to this problem, and we look forward to discussion of your technologies and your suggestions that might make it simpler for non-defense companies to deal with the Department of Defense.

Before we get started, I want to turn to my good friend, and Ranking Member, Neil Abercrombie for any comments he may have.

Mr. Abercrombie.

(pause)

[Acknowledge Chairman Hunter if Present]

(pause)

[Acknowledge Ranking Member Skelton if Present]

(pause)

In order to be most efficient today, I encourage each witness to submit your prepared statements for the record rather than read

them, and to simply speak to us directly about your technologies and experiences. Some of you have brought demonstrations. We look forward to seeing them. We are continuing to plow new ground today by holding this type of hearing, and I hope you will all bear with us as we try to make it run as smoothly as possible. We have with us today several small companies from around the country, which have developed technological solutions not apparently provided by the traditional industrial base.

The first panel will discuss the Small Business Innovation Research Program and offer their thoughts on how it might be improved. Welcome to our first panel members. The panel has a combined opening statement, which will be entered in to the record without objection. In order to be most efficient I would like to withhold questions until the panel has completed its opening remarks. Mr. Karangelen, the floor is yours.

Panel 1

Mr. Nick Karangelen
President and CEO, Trident Systems, Inc.

Ms. Heidi Jacobus
Chairman and CEO, Cybernet Systems Corporation

Mr. Bill Broderick
Chief Financial Officer, Analytical Graphics, Inc.

Thank you for your testimony.

[Member questions for panel 1]

Panel 2

Mr. Richard Hollis
President and CEO, Hollis-Eden Pharmaceuticals

Mr. Anthony Mulligan
President, Advanced Ceramics Research

Mr. Enrique Enriquez
President, Locust USA, Inc.

Mr. Tom Cuda
Vice President of Operations, VISTA Controls, Inc.

Mr. Greg Peterson
Chairman and CEO, SecuriMetrics, Inc.

Dr. Alexander Stoyen
Chief Executive Officer, 21st Century Systems, Inc.

Mr. Charles Harper
Executive Chairman, Sierra Monolithics

Next we will have series of short presentations from each witness for panel 2. We would like to have each of you briefly describe your company's accomplishments. Your prepared testimony will be entered in to the record, without objection. Following each presentation, members will be given opportunity to ask questions.

I will attempt to keep things moving, so that each of you have a chance to be heard; and then we will open the floor to additional questions for any and all at the end of the panel's testimonies.

Our first witness is **Mr. Richard Hollis**, President and CEO, Hollis-Eden Pharmaceuticals who has developed its immune regulating hormone for protecting the body from acute radiation injury. Mr. Hollis, please explain how your technologies can help improve homeland security.

[Questions]

Our next witness is **Mr. Anthony (Tony) Mulligan**, who has done some very interesting work in developing state of the art

composites that have increased performance while significantly reducing component cost. Mr. Mulligan, the floor is yours.

[Questions]

Our next witness is **Mr. Enrique Enriquez,** President, Locust USA, Inc. who has developed some very innovative, scalable, affordable jet engine technology that can be used for a variety of air vehicles. Mr. Enriquez, the floor is yours.

[Questions]

Next up we have **Mr. Tom Cuda (COO-DUH),** Vice President of Operations, VISTA Controls, Inc. who has developed a man-portable Quick Reaction Perimeter Intrusion System. Mr. Cuda, please begin.

[Questions]

Now we have **Mr. Greg Peterson** Chairman and CEO, SecuriMetrics, Inc. that is a world leader in the field of iris recognition and biometric security. Mr. Peterson, we look forward to your testimony.

[Questions]

Next we have **Dr. Alexander Stoyen,** Chief Executive Officer, 21st Century Systems, Inc. whose company is doing revolutionary work in intelligent agent based decision support software technology. Dr. Stoyen we look forward to hearing about your company.

Finally, we have with us just as of this morning, one additional witness, **Mr. Charles Harper**, whose company Sierra Monolithics, is doing exceptional work in developing a blue force locator beacon that can help prevent instances of fratricide. Mr. Harper will not be formally testifying but is prepared to take Member questions and demonstrate his product. Thank you for being with us today Mr. Harper.

I now ask that all witnesses come to the table as we open the floor to further questions.

[Questions]

Thank you all for participating today. I encourage everybody to remain to examine exhibits and to talk with the witnesses.

This hearing is adjourned.

TESTIMONY OF

NICK KARANGELEN, President of Trident Systems Incorporated

together with

HEIDI JACOBUS, CEO of Cybernet Systems Corporation

and

WILLIAM BRODERICK, CFO of Analytical Graphics Inc

Board Members of the Small Business Technology Coalition

Before the

HOUSE ARMED SERVICES COMMITTEE
U.S. CONGRESS

July 21, 2004

Mr. Chairman and distinguished members of the Committee, it is an honor to have the opportunity to appear before you today and give your Committee some perspectives from the small business community that serves the Department of Defense and other federal agencies. I am Nick Karangelen, president of Trident Systems Incorporated of Fairfax, Virginia. With me are Heidi Jacobus, CEO of Cybernet Systems Corporation of Ann Arbor, Michigan and Bill Broderick CFO of Analytical Graphics Incorporated of Exton Pennsylvania. We run small businesses that have significant contracts with the Department of Defense. Together, we have 54 years of experience in the small business sector. We also serve together as board members of the Small Business Technology Coalition. The Coalition is a non-partisan, nonprofit industry association of companies dedicated to promoting the creation and growth of research-intensive, technology - based U.S. small business. The Coalition includes about 200 small technology businesses that deal with the federal government.

We are here today to thank you and your Committee for your outstanding support of the nation's small business community that serves the Department of Defense, and to make suggestions to you that we believe can significantly improve the effectiveness of military systems while at the same time reducing cost and shortening development cycles.

There are 4 points I would like to make:

First, we appreciate the outstanding effort that each Member of this Committee makes to support our men and women around the globe as they protect our nation and wage the war on terrorism.

Second, over the last decade significant improvement has been accomplished to widen the role of small businesses in Department of Defense contracting. This would not have been possible without strong support from the Congress in general, and the House Armed Services Committee in particular. We appreciate what you have done for us, and thank you.

Third, your Committee included language in your fiscal year 2005 Defense Authorization bill which begins the process of changing the DOD culture to encourage program managers to incorporate more small businesses and their cutting-edge technology into mainstream procurement programs. We thank you for your continued leadership in behalf of the nation's small business community, and urge you to retain this language when your Committee goes to conference with the Senate.

Fourth, while we have made significant progress in broadening research opportunities for small businesses in the Department of Defense there remain significant cultural barriers within the Department for transition of innovative technology developed by the nation's small businesses into mainstream weapon system acquisitions. We have recommendations that if adopted we believe would inject more small business developed

innovative technology into defense systems for our warfighters while at the same time lowering costs. I would like to just take a moment to explain these proposals to you now.

Small business is widely recognized as the engine of innovation in America and the catalyst for developing ground-breaking technology and novel products. In February 2000 the US Small Business Administration's (SBA) Office of Advocacy published a working paper[1] summarizing the results of a number of earlier studies addressing small business in the US economy. The working paper reported that small businesses employed just over half (53%) of the US work force, over a third (36%) of the degreed engineers and scientists, and accounted for 14% of all non-federal expenditures of R&D in the US. A study conducted by the National Science Foundation titled *Will Small Business Become the Nation's Leading Employer of Graduates with Bachelor's Degrees in Science and Engineering?*[2] concluded, "as a group, small businesses hire as many recent S&E graduates as do larger ones, and also as many of all other sectors of the U.S. economy combined". The SBA white paper also points out that small business participation in Federally funded research and development has consistently been reported as less than four percent, far below their percentage of technology employment, industrially funded research and development, and other indicators of business innovation (e.g. patent awards). In fact, just the top 100 Department of Defense contractors received 88.9% of DoD RDT&E funding in 2003 (in an increasing trend from 85.5% in 2001.) This reflects the growing strong preference of DoD Program Managers for large contractors and the missed opportunities to leverage both the significant R&D capabilities represented by small firms as well as the products small firms have developed under their own industrially funded research.

Congress established the SBIR program in 1982 to ensure that federal R&D procurement officers and program managers made use of the wealth of resources available from small businesses in addressing the mission and research needs of their agencies. The GAO has studied and reported favorably on the SBIR program a number of times since it was originally authorized, endorsing the quality of research and the highly competitive nature of the SBIR award process.

The federal Small Business Innovation Research (SBIR) program has several phases. Phases I and II deal with research and development, while Phase III deals with the transition of successful research efforts to continuing R&D and to production. It is the Phase III portion of the program that needs your Committee's attention now.

Several years ago, the Congress clarified a number of SBIR data rights and Phase III contracting issues affirming DoD program managers' authority to transition successful SBIR projects into the mainstream of DoD acquisition, particularly into large programs, through the award of Phase III SBIR contracts. A small but growing number of DoD

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[1] *A New View of Government, University, and Industry Partnerships*, Office of Advocacy, U.S. Small Business Administration, February 2000.

[2] *Will Small Business Become the Nation Leading Employer of Graduates with Bachelor's Degrees in Science and Engineering?*, Division of Science Resource Studies, National Science Foundation, January 1999

Program Managers (mostly in the Navy) who recognize the significant contribution which small business can make to their programs have seized on this opportunity and transitioned SBIR technology into their programs through award of Phase III SBIR contracts.

An outstanding example of this is embodied by the Program Executive Office for Submarines (PEO Subs), Mr Richard McNamara who has fully embraced the SBIR program as a crucible for testing small business capability. PEO Subs has maximized the likelihood that its SBIR projects meet the needs of it program offices by soliciting topics from across all its programs and selecting topics according to Program Managers priorities by majority vote. Last year, for example, eight topics were selected from a pool of fifty-five. Small businesses selected for Phase I and Phase II awards are vetted both as technology developers and from a management capabilities point of view. The best of these small businesses selected by PEO Subs have been awarded over $700 million in Phase III contracts since 1995, the largest being a $169 million award in 2002 for the Tactical Control System portion of the Command Control System (CCS) MK2 for US nuclear submarines.

This example illustrates that a clear path exists for small business to make a significant contribution to large DoD programs in terms of improved capability, shorter development schedules and lower cost. A small, and slowly expanding, cadre of Defense Program Managers and Program Executive Officers, like Richard McNamara of the Navy, are effectively transitioning SBIR technology into their programs through award of substantial Phase III contracts. An informal survey found that DoD Phase III contract awards have risen every year from $30 million in FY 1998 to $342 million in FY 2003. It is clear that relevant research and development is being conducted by small business under the SBIR program and the contracting authority and resources are available to DoD program managers to transition successful SBIR developed technologies into DoD Acquisition programs of record.

However, in the overwhelming majority of cases, small businesses which have successfully developed relevant technologies under the SBIR program or otherwise are not transitioned into DoD acquisition programs of record. In some cases, the SBIR developed technologies may be seen as competing with established program interests or as a distraction from the program's plan. Some program managers may be unwilling to invest program funds in alternative technology candidates when they believe (as most do) that their programs are on track. Prime contractors are often polite but generally unwilling to bring in a promising externally developed technology when they have an internally developed alternative or believe (as most do) they can reasonably develop an alternative internally. In many cases, well intentioned attempts to include small business in major DoD programs fall short because of factors unrelated to the high technical quality, reduced costs, and shorter development times offered by small business and their technology solutions.

The Army's Future Combat System program(FCS) is an example of a large program which began with a modest plan for small business involvement in research and

development but, over time, contracted only a very small percentage (<1%) of the technical research and development effort to small business.

In your fiscal year 2005 Defense Authorization bill, this Committee directed that the Assistant Secretary of Defense for Acquisition and Logistics encourage DoD Acquisition Program Managers and Prime Contractors to make significantly more SBIR Phase III contract awards than has been done in the past and to report to Congress on Phase III award activity. This action begins to address what is perhaps the final barrier to more widespread employment of successful SBIR funded research and development in DoD acquisition programs: the DoD Acquisition culture which is focused on the execution of very large Defense Acquisition programs with very large contractors.

The Small Business Technology Coalition Board of Directors and the member small business technology companies we represent share the Committee's perspective that Phase III SBIR contracting is perhaps the most important aspect of the SBIR program because it is the mechanism for transition of SBIR funded research into DoD and is the most under-utilized facet of the Program. We would like to suggest that the House Armed Services Committee language to encourage more Department of Defense Phase III contract awards in FY 2005 merits follow-up in the FY 2006 Defense Authorization Bill.

The Small Business Technology Coalition has two recommendations for your consideration. First, establish an education initiative for prospective program managers at the Defense Acquisition University that will provide tools needed to facilitate the incorporation of small business technology that has been developed and paid for by the government into weapon system production. Second, your Committee should establish a matching funds incentive for Phase III SBIR contract awards. Our Coalition would be happy to provide you and your staff additional information on these proposals. Both of these recommendations could be centrally implemented within DoD by the Office of Secretary of Defense, Office of Small and Disadvantaged Business Utilization (OSD/OSADBU)

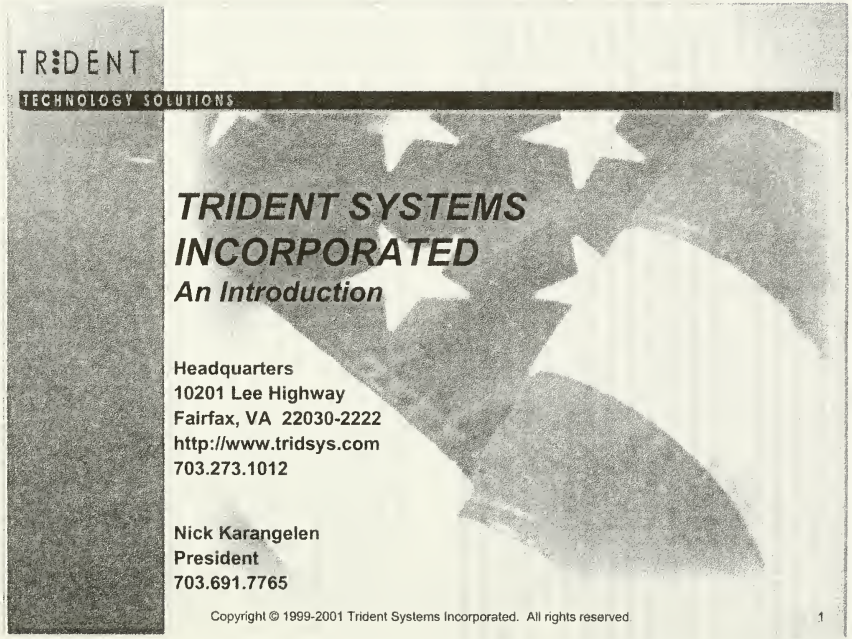
The first element of a candidate Phase III SBIR transition incentive would provide DoD Program Managers with matching R&D funds for each dollar of Program R&D committed to a Phase III contract with a SBIR company to continue development and/or insertion of SBIR developed technology. This should include a limit of not more than $2 million in matching R&D funds for any single SBIR effort. The second element of the Phase III SBIR transition incentive would provide matching procurement funds (up to a limit of perhaps $5 million per SBIR effort) for procurement of SBIR developed technology end items through direct contracts with a SBIR company or for SBIR developed items procured under a SBIR company's GSA schedule

A Phase III SBIR transition incentive such as the one we propose would provide a powerful rationale for Defense Program Managers to incorporate successful small business technology developments in their programs. It would help to overcome the resistance that established programs of record for defense weapon systems typically have

to emerging innovative technology opportunities that spring from the nation's small business community. This incentive would result in a growing number of Defense Program Managers with experience employing small high-tech businesses not only for providing rapid technology solutions, but also in the critical role of providing low cost risk mitigation and competitive alternatives in large complex Defense programs.

The payback from this initiative would be shortened development cycles, lower cost systems, and higher quality systems both from the specific contributions of innovative small companies and from the natural reaction of the large prime contractors to work harder in the face of small business efficiency and innovation. These properly transitioned Phase III efforts would stimulate DoD program managers to think more often about small business in providing competitive alternatives and rapid innovation in their programs and simultaneously broaden and strengthen the defense industry and manufacturing base in America.

We thank you again for your willingness to hear our perspectives on the increased role that the nation's small business community could have in bringing the brave men and women in uniform who are protecting our nation's freedom around the world and waging the war on terrorism with better technology at lower cost.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Washington Navy Yard Campus Renovation Award

Invited Testimony at House Armed Services Committee Hearing on Small Business Technology Innovations

Growing Reputation for Innovation, Excellence, Service, and Value

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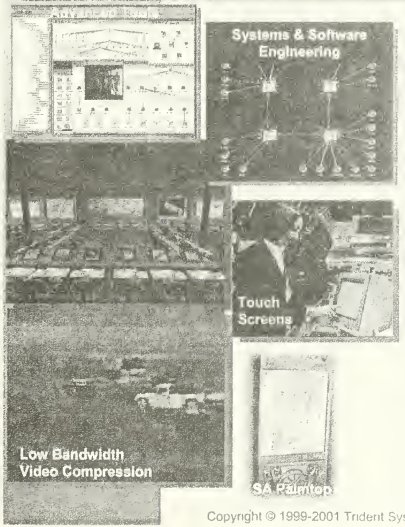

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CYBERNET SYSTEMS CORPORATION
727 Airport Boulevard
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Statement of Ms. Heidi Jacobus
Chief Executive Officer,
Cybernet Systems Corporation

To:

HOUSE ARMED SERVICES COMMITTEE
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE
U.S. HOUSE OF REPRESENTATIVES

ON:

"Perspectives on the Small Business Innovation Program Within the Department of Defense"

Washington, D.C.

15 July 2004

First, I want to thank Chairman Weldon, Ranking Minority Member Abercrombie, and members of the subcommittee for the opportunity to testify about the importance of the SBIR program to small defense contractors. I appreciate the opportunity to talk to the subcommittee about my experiences as a woman-owned small business working with the Department of Defense.

My name is Heidi Jacobus, and I am the founder and Chief Executive Officer (CEO) of a high-technology company called Cybernet Systems in Ann Arbor, Michigan. The SBIR program provided me the opportunity to start my own company. I am confident the company would not exist without this program.

I am an unlikely entrepreneur. My family had no background in business. My immigrant mother could not speak English when I was born. In fact, neither of my parents finished high school. Both worked, sometimes two jobs, in factories. But they valued education.

Thanks to their hard work, I was able to pursue an advanced education. Before I finished my Ph.D. in Computer Science at the University of Illinois, I found a near perfect match with my thesis and a SBIR topic from ARPA. I can still remember the day 15 years ago when an Air Force Colonel called me to tell me that my proposal was "the best he'd ever read." I was thrilled. I was energized. And Cybernet began in my daughter's bedroom, after I moved her in with her younger brother.

Today, Cybernet has won over 200 SBIR contracts making us the most successful winner in Michigan, in fact, in the entire Midwest. My small company employs nearly 50 engineers and scientists. We have been granted 22 US patents. Under SBIR we developed a telemedicine device called MedStar which has earned FDA 510k certification, and has received national awards. Recently, MedStar was inducted into the Space Foundation Hall of Fame in Colorado Springs where Buzz Aldrin gave 5 of my engineers medals. The SBIR program managers from NASA, DARPA and NIH, who had the foresight to fund our work years before, were also honored.

I am sure the committee has heard this before, but, in my opinion, the SBIR program is about the only avenue for small high-tech businesses like mine to do R&D work for the Department of Defense. Without SBIR, companies like mine would not exist.

The SBIR program is so vital to small high-tech businesses like mine because it is tough out there for small high-tech businesses. Every day, my small company with fifty people is competing with thirty billion dollar defense giants for work. In the technology areas we care about, we've seen a trend in government

contracting towards very, very large contracts. Realistically, these can only be performed by very large contractors. The opportunity for small innovative firms to successfully bid on these huge contracts is very small even though we might have more technical expertise in a particular field such as unmanned ground robotics than any of the prime contractors. But with a single massive defense contract no small business can qualify to do the whole job. We have to compete for the work from a prime contractor. What we find is unfortunate; it is rarely in the best interests of large contractors to carve out critical and profitable parts of systems for small businesses.

I would add that woman-owned small high-tech businesses face even more daunting obstacles. I can tell you that woman-owned companies have strong skills, but we lack the network of connections, military experience, and access necessary to break through. There are currently no mentoring programs that reach out to women.

That is why the SBIR program is so fantastic for small high-tech businesses. The program was crafted brilliantly by Congress to provide people like me a pathway to perform advanced R&D for the government and even build a company around that technology. My company has developed a host of technologies ranging from telemedicine to gesture recognition to state-of-the-art robotics and all were stimulated by SBIR.

But let me add, winning the SBIR contracts to develop these technologies was tough. Competition in Phase 1 and Phase 2 is fierce. In 2002, there was an average of 14 Phase 1 proposals submitted for every SBIR topic the DoD published.

My company has just been awarded a Phase 3 contract to produce an automated visual inspection system for ammunition. We have a Phase II SBIR in progress to investigate technologies for ammunition inspection, but the war in Iraq has created an immediate requirement for a system that can inspect large quantities of ammunition quickly and affordably. An engineer at the McAlester Army Ammunition Center read a synopsis of our technology and called us. Based on our Phase 2 progress, we were able to quickly demonstrate a system.

Following the demonstration, there was a real urgency to get a contract in place so that we could build and deliver a working system. Under the SBIR program, it was possible to sign a Phase 3 contract immediately to produce the system based on our Phase 2 work. But the McAlester contracting office was hesitant,

because they had never done Phase 3 SBIR contract. Fortunately, we found another Army contracting office familiar with Phase 3's, and willing to take over this contracting effort. Our contract began just last week, and we expect to deploy a working system to Iraq in three months. I don't know any other acquisition path other than SBIR that could make this possible. I commend the Congress, because it was your reauthorization of the SBIR program that clarified and strengthened the program with regard to Phase 3 making it far easier in just these situations.

That is why I believe this proposal to create a Phase 3 SBIR incentive program could be so important. An incentive program could provide momentum to move promising technologies forward and provide a path to get the technology to the field, to the end-users.

We are aware that an increase in SBIR funding for Phase 3 will be a contentious issue for the Department of Defense. But this small additional set aside for SBIR Phase 3 incentives can have a revolutionary impact on the DoD. We need be able to respond more rapidly with affordable solutions that can be put in the hands of our military personnel in months, not years. The SBIR program and small high-tech business are one means to accomplish this.

Making these kinds of changes in thinking is tough. But I think we can provide incentives that will encourage the Department of Defense to draw more heavily on the innovation of small high-tech business. This proposal is a tremendous first step. And, I believe the benefits could be truly transformational.

I want to thank you for taking the time to hear my story and thoughts on this topic. I will be happy to answer any questions.

Statement of
Mr. William Broderick
Chief Financial Officer, Analytical Graphics, Inc. (AGI)
And Board Member of the Small Business Technology Coalition

Before the House Armed Services Committee
Subcommittee on Tactical Air and Land Forces

Regarding Small Business Innovation and Technology

21 July 2004

Chairman Weldon, Congressman Abercrombie, and Members of the Subcommittee, I am Bill Broderick, CFO of Analytical Graphics, Inc. (AGI), a 230-employee software company. I also serve as a board member of the Small Business Technology Coalition (SBTC).

First, I would like to thank the Chairman and members of the Subcommittee for the opportunity to testify. I hope to provide some insight into the critical role of small businesses in supplying cutting edge and often unique technology to the defense community. In a continual effort to improve our products and to assist in fulfilling important national security requirements such as the Global War on Terrorism, we at AGI commend the Subcommittee for examining these issues as we *must* stay ahead of our adversaries technologically.

I am here because of our continuing concern for the lack of reasonable inclusion of small businesses with cost-effective and superior technologies in defense contracting. From our own experience, that of other small businesses, and independent studies, we are aware that current Department of Defense (DoD) practices favor large embedded corporations, which I will discuss later.

From this perspective, we believe the single greatest challenge to the insertion of proven technologies from small business into the mainstream DoD acquisition process resides in the following question:

How can DoD prime contractors embrace best of breed technologies from small businesses when, for the most part, the current acquisition environment has disincentives to use lower cost, commercially available technologies?

Company Background
AGI produces commercial-off-the-shelf (COTS) software for analysis and visualization of land, sea, air, and space assets. The company was founded in 1989 by three former GE Aerospace employees who saw a need for commercialization of space applications that did not exist then, and was not being pursued in any form by GE or other large defense contractors. Over the past 15 years, AGI has grown to a 230-person company and was recently named the best small company to work for in America by the Great Place to Work® Institute and Society for Human Resource Management. Over our history, we have

been able to assemble a dedicated and talented team of employees to support a unique and innovative product line with nine issued patents to our credit.

Through our team of more than 120 engineers and scientists, we have developed over three million lines of commercially available code, providing national security and space organizations with unparalleled, cost-effective capabilities that can be rapidly deployed. As a point of reference, according to an article by Donald J. Reifer in the March 2002 publication of The Journal of Defense Software Engineering, the DoD typically pays defense contractors $150 per line of source code for custom developed software similar to that of AGI. Assuming a program only required 30% of the capabilities contained in the 3.0 million lines of code commercially available from AGI, the cost to the program using typical DoD contractor rates would be $135 million. Those same capabilities could be purchased from AGI at approximately one-tenth of the typical cost and be immediately inserted into the program without having to go through many years of development. This would also free up critical resources to apply to the unique areas of the program where technologies do not exist.

AGI's core software is a powerful geometry engine that analyzes intricate data and provides pinpoint-accurate dynamic two- and three-dimensional representations. These representations enable users to easily determine the position of aircraft, spacecraft, ships, missiles, and other moving objects. The software is flexible enough that it can be customized and integrated to user needs. This facet of our software is critical to developing capabilities like a single common operating picture (COP) in which multiple data sources can be assimilated into a single representation. For example, in a battle theater scenario, ground troops need to understand where their air support is and where it is going. Similarly, an intelligence officer needs to see a cohesive picture to make an informed assessment. We are proud that our software is now used broadly throughout the national security community.

AGI Business Model

From inception, our business model has incorporated requirements of the national security and space communities. Through our private investment, we have developed standardized software that we have commercialized into over twenty products, providing unparalleled analysis and visualization capabilities for our users. Under this method, we spread the cost of the initial and on-going development across a wider base of the marketplace. Concurrently, we commercialize the technology to benefit a broad spectrum of the national security and space communities, not just one program. We compete on product quality and cost, user productivity and effectiveness, as well as mitigation of risk associated with custom software development.

While we offer a standard solution to meet common needs, it is important to make a distinction between AGI and commercial software vendors like Microsoft, Adobe, or Oracle, who offer products to a mass commercial market. Vertically focused companies like AGI serve the national security community and we do not compromise quality or customer needs to the pressures associated with mass-market industries. Our research and development investments and business decisions are made with the knowledge that our product will be used under the most stringent and critical of circumstances.

Based on our experiences, some best practices for the insertion of proven and innovative technology into defense systems involves the program office and lead contractor identifying and embracing commercially available technology early in the acquisition process. An outstanding example of this involves the collaboration of two programs – the NRO's Battlespace Visualization Initiative (BVI) and the Joint Deployable Intelligence Support System (JDISS) managed by the Office of Naval Intelligence. The customers utilized AGI technology components to deliver a collection management capability as an element of this comprehensive and vital program for the warfighter. The customers possessed a firm understanding of how commercially available technologies could meet its requirements for the rapid deployment of capabilities to assist the warfighter. AGI worked with the customers to develop a flexible licensing agreement that would allow for immediate distribution of software licenses at any time and anywhere. This case demonstrates how collaboration between industry and government from the outset met the needs of both parties.

Most of our success stories, however, involve a program that is failing or has failed. Frequently, we are contracted to salvage programs after millions of dollars have been spent. One example involves a major aerospace company that spent roughly three years and $37 million dollars trying to develop a custom software solution involving analysis, visualization, and decision support for military space assets. To assist this prime contractor, the AGI team delivered a $1.5 million solution within 6 months to fulfill the key program requirements.

This case, among others, demonstrates that if prime contractors would use proven, commercially available technology from the outset, they would complete programs more efficiently and effectively. Academic research has shown that use of commercially available technologies is rare in government contracting because the acquisition system does not provide incentives to seek out and utilize existing innovations. Practices that once made sense when computing technologies were in their infancy are still embedded in the government acquisition structure and, in many cases, are harmful to the contracting process because they do not optimize the best and most cost-effective technologies available in the marketplace.

Challenges from AGI's perspective

Under certain circumstances, AGI has enjoyed success in introducing our commercial software to the DoD and its major contractors. However, this is frequently not the case. Based on AGI and other small businesses' experiences, the traditional cost-plus-award-fee (CPAF) contract system has increased the difficulty in offering proven innovations to the DoD by inadvertently rewarding higher expenditures and reducing incentives to cut costs. Simply put, the more a program costs, the more a contractor makes. While this practice works well in certain instances, it does not work when software and other high-tech products are available in the marketplace. Further, this practice creates disincentives for typical DoD contractors to reduce program costs. In addition, the trends of DoD marketplace consolidation and contract bundling significantly reduce small business access to programs as well as DoD leverage over prime contractors.

In recent years, the impact of DoD transformation on small businesses has drawn significant attention from researchers, academics, and the DoD itself. I would like to specifically mention the research of Dr. Sally Baron. Her research concludes that organizational barriers to incorporating commercial technologies are prevalent, including: misaligned reward systems, entrenched networks, and historical precedent. Dr. Baron has examined several actual DoD acquisitions that have clearly ignored superior technologies from small business, and employed inferior and unproven technologies at higher cost.

AGI's Recommendations

We would like to see contracting practices evolve to encourage the DoD to employ best-of-breed technologies from small business. We believe that alternative contracting structures are necessary to foster adoption of commercially available innovations in the mainstream defense marketplace. AGI's vision for the DoD acquisition environment would involve several initiatives:

- Align resources to advance technological development of unique capabilities and eliminate reinvention by using proven technologies that are available in the marketplace – created under Small Business Innovation Research (SBIR) programs or otherwise;
- Fuse the most innovative technologies in an architecture that can be easily upgraded (or "spiraled");
- Push for creative licensing options so that superior and affordable technologies from smaller companies are employed.

To move the DoD marketplace closer toward this vision, we believe that current transformation initiatives may offer appropriate vehicles to further collaboration between small innovative businesses, large defense contractors, and the DoD. For example, the DoD has initiated efforts that include closer examination of software development costs. AGI applauds this effort, but would urge the Department to go one step further and make the information collected available to Congress through a progress report in order to facilitate an open dialogue on the implications of commercialized technology insertion into DoD programs. We strongly believe putting the facts on the table, open for review by Congress and businesses alike, would facilitate a more productive dialogue. Ultimately, this collaboration would help illuminate a path through which Congress, the DoD, and industry could foster greater inclusion of proven, small business technologies, reduce program costs, and improve our national security.

At AGI, we are well aware that this problem is complicated and multi-faceted and that progress has been made to change these inequalities. We are grateful to the conscientious people in Congress, government, and industry who have made positive changes. Through collective actions, we can work together to realize healthy competition and technical innovation in the U.S. defense marketplace.

We are grateful to this subcommittee for holding this hearing on topics vital to the health of our DoD, and for the opportunity to testify. We are also available, at your convenience, to discuss in greater detail any of the initiatives discussed in this testimony.

I welcome your questions. Thank you.

**TESTIMONY OF RICHARD HOLLIS,
CHAIRMAN AND CHIEF EXECUTIVE OFFICER,
HOLLIS-EDEN PHARMACEUTICALS,
BEFORE THE COMMITTEE ON ARMED FORCES,
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES,
UNITED STATES HOUSE OF REPRESENTATIVES,
JULY 15, 2004**

Mr. Chairman, Ranking member Abercrombie, and other members of the Subcommittee, thank you for the opportunity to testify before you today. Mr. Chairman, before I begin, allow me to thank you personally for your longstanding efforts to help safeguard this nation against weapons of mass destruction (WMD).

My name is Richard Hollis. I'm Chairman and Chief Executive Officer of Hollis-Eden Pharmaceuticals (Hollis-Eden). Hollis-Eden is a San Diego-based biotechnology company, publicly traded on the NASDAQ exchange under the symbol "HEPH."

We appreciate this opportunity to testify before you today at the Small Business Innovation Hearing.

Our nation is now engaged in an asymmetrical war on terror. Our enemies don't fight in accordance with traditional rules of war or concepts of fairness. Our enemies don't differentiate between civilians and combatants; in fact, they specifically target civilians as soft targets. There are no clearly defined frontlines here; the battleground is as much Boston as Baghdad, Knoxville as Kabul.

A conventional war can be won by arming America's troops—the world's best-trained and most-dedicated fighting force—with advanced weapons systems. There isn't a fighting force in the world that can go toe-to-toe with our military. (And, large government contractors are often best suited to building such billion-dollar weapons systems.) However, this point isn't lost on our enemies. As a result, this isn't how today's wars are being fought. Defeating today's asymmetrical threats requires speed, ingenuity and innovation. Here I'm referring not just to our frontline units, but also to the industrial and scientific complex that supports our troops and provides for our national security.

The private sector is the engine of American innovation. And, within the private sector, it is small and medium-sized companies that are constantly and most rapidly pushing the envelope. Our company, Hollis-Eden, is a perfect example of that fact. In that vein, allow me to briefly reflect on our experiences as they exemplify both the challenges and opportunities.

For the last ten years, Hollis-Eden has been developing a proprietary class of compounds known as Immune Regulating Hormones (IRHs) for the treatment of infectious diseases and immune system disorders. Since 1997 the Armed Forces Radiobiology Research Institute (AFRRI), which is part of the Department of Defense, had been testing one of

our drug candidates, at that time code named HE2100, in models of radiation injury and had reported positive results of these experiments in various medical journals and scientific meetings. Shortly after the 9-11 attacks we were contacted by AFRRI and asked to develop HE2100, now called Neumune™, to protect victims of a nuclear and radiological attack or incident. (A complete overview of Hollis-Eden's drug development efforts is provided as attachment A to this testimony).

In a nuclear or radiological attack, the vast majority of victims would die from radiation sickness as opposed to the actual blast. For example, experts have concluded that a terrorist attack on New York City using a 12.5-kiloton device, which is relatively small by nuclear standards, would kill roughly 250,000 people; 200,000 of which would die from radiation sickness. Additionally, experts warn that in this scenario 700,000 additional people would suffer from various levels of radiation sickness. Radiation sickness kills and injures by depleting the body's immune system to the point at which the victim can no longer protect himself from opportunistic infections. The point at which the immune system is severely compromised is a condition known as "neutropenia."

Neumune works by boosting the body's own immune system. In primate testing conducted in conjunction with AFRRI, using exposure to levels of radiation that would be experienced in a nuclear attack, every animal in the control group went neutropenic and would be at risk of death without medical support. Not one of the monkeys given high doses of Neumune went into the neutropenic zone, and monkeys receiving lower doses experienced only short-term or mild neutropenia. In other words, had this been a real world attack, all the control group would be at much higher risk of death compared to the Neumune treated group. In essence, if this drug is proven safe and effective it the holds the promise to be the penicillin for the nuclear age.

Prior to 9-11, Hollis-Eden was focused on a range of other, private market applications for this class of drugs—Infectious diseases such as HIV, malaria and tuberculosis as well as a variety of autoimmune disorders such as multiple sclerosis and rheumatoid arthritis. While we continue to develop these other applications, in the wake of 9-11, we shifted the company's focus to developing the nuclear antidote. Since our inception the Company has invested in excess of over 120 million on the technology platform.

On two occasions (specifically the FY04 and FY05 House Reports on the Department of Defense Authorization Acts) this Congress has noted the progress in and importance of developing Neumune as a medical counter-measure against a nuclear attack. In both cases the House recommended increased spending to speed the development and deployment of Neumune. Such funding has yet to be provided; to date, we have developed this drug through company funds. Over the last roughly three years, we have invested over 60 million of the company's money focusing on the development of this drug.

We did so for three reasons.

First, we focused on developing Neumune because it was the right thing to do for our nation. The overwhelming weight of expert opinion is that there is no greater threat to this nation than the nuclear threat. Let me briefly underscore this point with a few straightforward facts:

- Evidence discovered in Kabul, Afghanistan, including bomb design drawings and extensive downloaded materials on nuclear weapons, clearly demonstrates al Qaeda's interest in obtaining a nuclear weapon.
- Osama Bin Laden himself has said that obtaining nuclear weapons is "a religious duty."
- Captured Al-Qaeda leader Abu Zubaydah has admitted that al Qaeda was working to build "dirty bombs," including those made from nuclear waste.
- There is evidence that al Qaeda has planned to attack nuclear facilities located here in the United States.
- Mohammed al Baradei, chief of the International Atomic Energy Agency, the United Nation's nuclear oversight agency, recently announced that the threat of a terrorist attack using nuclear weapons is "real and imminent." He called the threat a "race against time."

These facts must also be viewed in light of the current nuclear landscape:

- At the time of its break-up, the Soviet Union possessed enough weapons-grade nuclear material to make 60,000 nuclear warheads—much of this material is now either unguarded or unaccounted for, or both.
- Outside the former Soviet Union, more than twenty tons of highly enriched uranium is spread across 130 civilian research facilities in 40 countries, many of which are secured by nothing more than a night watchman and a chain link fence.
- The International Atomic Energy Agency reports that there have already been 16 thefts involving highly enriched uranium (HEU) and plutonium. One such incident involved the theft of roughly two kilograms of HEU from a research facility in the nation of Georgia. The whereabouts of this material remains unknown.
- Operational information about how to manufacture a basic nuclear device is available on the Internet and in library reading rooms around the world.
- Iran, which has a history of supporting terrorists, has restarted its nuclear program and is capable of producing weapons grade uranium.
- North Korea, which has a history of supporting terrorists, continues to develop its nuclear program and is believed to have operational nuclear weapons capable of striking the United States.

These risks must also be viewed in light of the strengths and weaknesses of our homeland security effort:

- We inspect less than five percent of all cargo containers entering the United States.

- The General Accounting Office recently reported that the current system used to target high-risk cargo for inspection is fundamentally flawed.
- At last count we are aware of, only 100 of the 4,500 "C-TPAT" participants, whose cargo now is expedited and faces fewer, if any, inspections have had their security procedures merely verified.
- Just 1,000 Border Patrol agents are assigned to the 5,000-mile US-Canada border—assuming every agent works eight-hour days, every day, without leave, that leaves just one agent for every fifteen miles.

There is the very real risk that a terrorist could succeed in slipping a suitcase nuclear device into this nation and detonating it from a remote location. In such a scenario, the terrorist leaves no return address—making traditional notions of nuclear deterrence and defense outdated.

Based on these risks, we now conduct scores of drills designed to test our nation's ability to respond to a nuclear attack. There is a frighteningly "Dr. Strangelove" quality to these exercises. In these drills, teams of medical professionals deploy to face what in reality would be casualties numbering in the tens or hundreds of thousand. These medical personnel are armed with bandages, saline washes, compassion, and little else. For the vast majority of victims, absent deployment of Neumune, they would have nothing to offer the victims but prayers. And, this is to say nothing of how they will deal with the waves of worried well, who will inundate medical facilities and by their sheer number grind things to a gridlocked halt.

In these same exercises we prepare to send National Guard Civil Support Units and first responders in to save lives. However, we cannot adequately protect these units against radiation. The protective gear these units now use cannot stop certain forms of radiation. And, in the case of a larger nuclear attack, we simply do not have enough protective gear for all our first responders. This leaves these vital individuals completely unprotected. If we deploy them into the hot areas where they can do the most good, we will lose them to radiation sickness. We are damned if we do, and damned if we don't.
Nor do these drills ever actually confront the mass exodus and total chaos that will result as people literally flee the prevailing wind. Imagine how people will react as television meteorologists stand before maps showing not rain clouds, but nuclear clouds.

The only way to save lives in the event of a nuclear attack is through the development of an effective medical counter-measure. The only way to reduce the demand on medical facilities that will be stretched to the limit is by reducing the number of casualties, which requires a medical counter-measure. We can only effectively deploy National Guard and civilian first responders after a nuclear attack if we can truly protect them and that will require a medical counter-measure. The only way to prevent a mass exodus is to be able to protect these people, and reassure them, in place, that they are safe. The only way to do that is through an effective medical counter-measure. In other words, we can drill all we want, but until we have in place a medical counter-measure, such drills will be as meaningless as the old "duck and cover" response of our childhood days.

Second, we focused on Neumune because we couldn't live with ourselves if we hadn't and something happened. The simple fact is that we are all now aware of the grave threats to this nation. If our nation were to be attacked tomorrow with a nuclear weapon, the fact that Neumune exists raises the specter that many of those who would die in such an attack could have been saved if they had this drug available to them.

We at Hollis-Eden are doing all that we can to get this drug developed, approved and stockpiled as fast as possible. However, we don't control this process. We will soon conduct a pivotal study with Neumune in non-human primates (which the company believes is comparable to a Phase III clinical trial) to demonstrate efficacy under the new FDA rule. Soon after that study we will conduct a large safety study in healthy human volunteers. At that point the drug approval process will be strictly in the hands of the FDA. By the same token, the process of deploying this drug is strictly in the hands of the Department of Health and Human Services working in conjunction with the Department of Homeland Security. For the military these deployment decisions are in the hands of the Pentagon. These agencies determine if and when they will seek to buy Neumune and on what timetable this deployment will occur. We can only hope to be faster to the punch than those who want to do this nation harm.

Lastly, we focused on Neumune because it made smart business sense. The Food and Drug Administration (FDA) WMD drug rules offer us a way to potentially get a product to market swiftly--however, that assumes a market. Unlike most drugs, the private sector market for medical counter-measures is unclear at best—that is until after an attack. This is a classic market failure.

Last week the Congress passed the BioShield legislation, which is intended to rectify this market failure.

The purpose of BioShield is to provide the private sector with the necessary incentives to encourage investment in the development of medical counter-measures.

The promise of BioShield is not merely a dedicated funding source for medical counter-measures; rather, it is the ability to leverage private sector investment through early market signals.

In our analysis, the combination of advanced purchase contracts establishing the defined market for a new drug and the expedited approval process made investing in a nuclear counter-measure a smart business decision.

That said, it took much longer to get BioShield passed than was originally anticipated. That delay, and uncertainties about how the program will be implemented, is causing the financial community to grow increasingly wary of investing in this new sector of specialized pharmaceutical development.

The most troubling uncertainty about BioShield implementation concerns how contracts will be awarded. We understand there are agencies interpreting BioShield to provide for

the award of a contract only after an IND is filed with the FDA to start human studies. While an IND might be an appropriate point for contracting in traditional drug development, in the area of medical counter measures all of the large efficacy studies are likely to be performed in animals before an IND is filed, and human studies will be performed just to establish safety, after most of the risk and expense has been incurred. In other words, such a reading of the law would undercut the very impetus, the very market, that program was designed to provide. Such interpretation runs directly counter to the intent of the legislation and will seriously limit investment in this area.

In order to stimulate the private sector to invest in medical counter measure research, advanced purchase contracts need to be awarded early in the drug development process. This will require at least three steps:

- The criteria for BioShield advance purchase contracts need to be defined and known. These criteria should be based on the scale of the WMD risk, the lack of current treatments; the potential success of a new counter-measure; and a company's ability to deliver on that promise.
- WMD threats need to be identified and treatments prioritized. For example, it is our view that the nuclear threat—the greatest threat to our nation—is now lost amid a plethora of other threats that are significant but not of the same magnitude.
- RFP's, setting out needs and terms of purchase need to be released—now, not after it is too late.

In order for the United States to develop the medical countermeasures required to safeguard the American people from WMD, the program must be implemented as it was rightly envisioned: not as a pool of money to be held uncommitted for procurement until drugs are successfully developed, but rather as a pool of money that can be committed to promising technologies early in the development process. The idea behind BioShield legislation was to have the government contracting process occur early enough in the development program that entrepreneurial companies could attract the necessary outside capital to allow these promising technologies to be developed.

We would also encourage Congress to quickly take up further legislation that was contained in S. 666, which provided additional protection in the areas of indemnification and intellectual property protection as well as tax incentives to further encourage work in this area. While the intentions of BioShield are worthy, if the incentive structure is not sufficient, the output, in terms of the number of new effective medical countermeasures that are developed, will not be either.

Today's asymmetrical war cannot be won by firepower alone. The experts tell us that it is only a matter of time before a terrorist uses WMD against this nation. Simply put, you can't win an unconventional war using conventional weapons and tactics. You can't eliminate a deadly virus with an Abrams tank. A flak vest is little protection against a nuclear or dirty bomb. However, medical counter-measures can literally take these

weapons out of the hands of terrorists. The only question is: will we take the steps necessary to develop such counter-measures now, or only after it is too late?

* * *

Just before the beginning of World War II, Albert Einstein and a number of other very distinguished scientists wrote to President Roosevelt to make him aware that the Nazis had begun efforts to develop a nuclear bomb. Sensing the danger, Roosevelt embarked upon the Manhattan Project, a joint effort of the public and private sectors, bringing together our brightest minds, to beat the Nazis to the bomb. The Manhattan Project culminated in the United States developing the first nuclear weapon. I raise this because it points out both the danger and the promise.

Since the end of World War II, mankind has lived with the fear of a nuclear bomb—a weapon so devastating that it is all but beyond our comprehension. In this era of terrorism and rogue nations the nuclear risk to our nation is, in my view, greater than ever before. The proliferation of these weapons and eventual use of a nuclear device against our great nation is the very real danger we face.

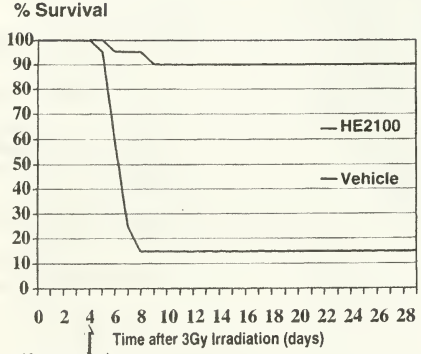
However, now, with Project BioShield, we can envision a new sort of Manhattan Project, one in which the strengths of the American government and our vibrant private sector are combined to win the arms race inherent in the war on terror. Today's arms race pits the terrorists, who want to use weapons of mass destruction, against our ability to find medical counter-measures to render such arms useless. It is a wonderful irony that one of the first threats that BioShield—a modern-era Manhattan Project—stands poised to defeat is the nuclear threat that the first Manhattan Project ushered in.

Confronted with the threat of nuclear weapons, President Roosevelt acted swiftly and boldly. We have no choice but to follow his example today in answering that same threat.

Mr. Chairman, Ranking Member Abercrombie, members of the Subcommittee, thank you for the opportunity to appear before you today.

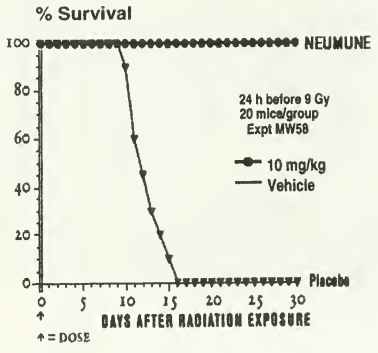
Neumune can Potentially Save Hundreds of Thousands of Lives

Mice Survival Rate After Sub-lethal Radiation Injury And Infection



- Adapted from Whitnall et al., *Int'l. J. of Immunopharmacology* 22 (2000)

Mice Survival Rate After Exposure to Lethal Radiation



Slide 1

10kt Nuke Used in New York: Hundreds of Thousands Dead, Hundreds of Thousands Severely Injured

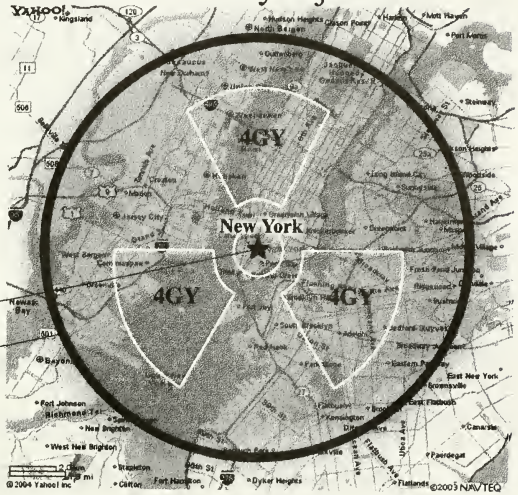
Radiation Dose Effect on the Body

1Gy – Nausea and vomiting in 10% of victims

2Gy – Nausea and vomiting in 50% of victims, decrease in bone marrow cells, neutrophils and platelets

4GY - 50% mortality without medical treatment

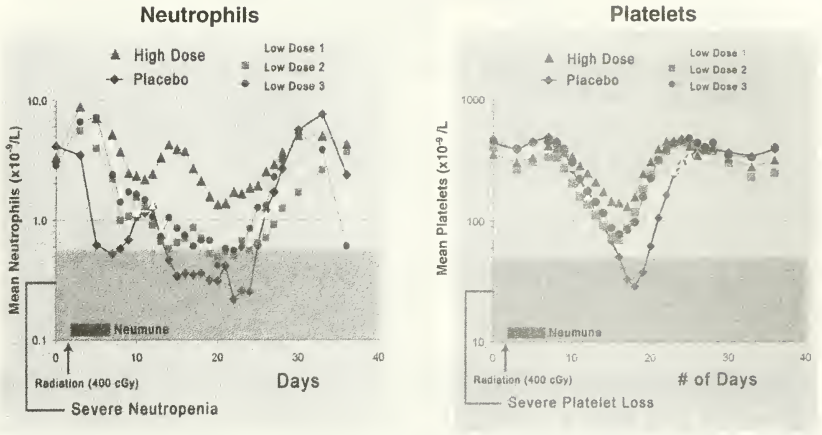
6Gy – 100% mortality within 30days from bone marrow failure



NJM May 2002

Slide 2

5 Days of Dosing with HE2100 Protects Bone Marrow Against Radiation Damage in Primates



Slide 3

The Increasing Nuclear Threat

AP Associated Press

May 4, 2004

Simulation Gives Glimpse of Nuke Terror

washingtonpost.com

January 24, 2004

Probe of Libya Finds Nuclear Black Market

The New York Times

March 3, 2004

Bush Envoy Briefs Panel After Talks on A-Bombs

USA TODAY

February 19, 2004

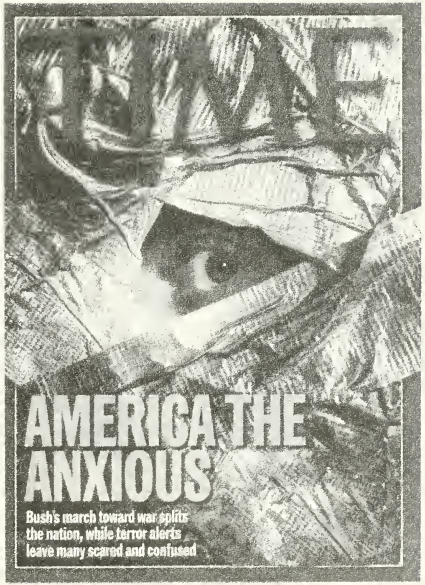
Nuclear Machinery Found in Iran

ABC ONLINE

January 23, 2004

Nuclear Black Market 'Unsettling'

Slide 4



We Can Do Better Than This?

Slide 5

Testimony by:

Anthony C. Mulligan

Advanced Ceramics Research, Inc
Tucson, Arizona

Hearing on Small Business Innovative Technologies and Research

House Armed Services Subcommittee on Tactical Air and Land Forces

July 21, 2004

Chairman Weldon, Ranking Member Abercrombie, and members of the House Armed Services Subcommittee on Tactical Air and Land Forces, thank you for inviting me to testify before you here today at your hearing on small business innovative technologies and research.

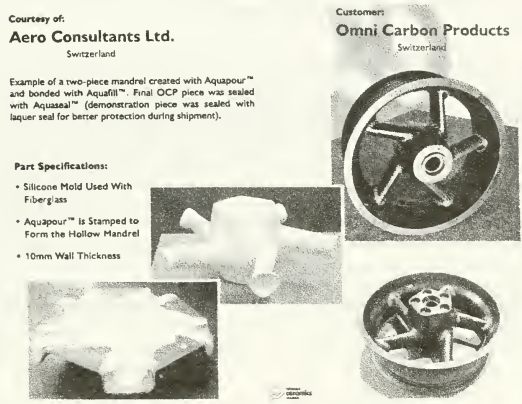
My name is Anthony C. Mulligan and I am the CEO of Advanced Ceramics Research, Inc., (ACR), of Tucson, Arizona. ACR is a successful small high technology company that through the support of the Department of Defense, and other Federal agencies, primarily the Office of Naval Research and DARPA small business research programs, have developed a family of new enabling technologies for manufacturing processes. These processes are already demonstrating a cost savings for a broad range of military weapon systems, ultimately benefiting our troops in the field as well as American taxpayers.

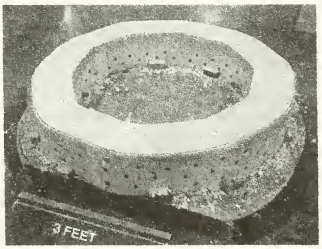
Through the SBIR program ACR has developed multiple manufacturing process technologies including a NAVAIR funded SBIR technology called Water Soluble Tooling (WSS), a DARPA technology called Extrusion Free Form Fabrication (EFF), and an ONR technology called Solid Free Forming (SFF).

ACR's Water Soluble Tooling has demonstrated tremendous cost savings over traditional metal for a number of applications. In one case, ACR manufactured the tooling for a large carbon composite component for a cost of approximately $15,000. The customer who was a larger Defense Prime Contractor stated that comparable metal tooling would have cost over $1 million dollars to fabricate. In a second case, ACR fabricated tooling for about $5,000 which replaced traditional metal tooling costing nearly $150,000. In addition to Navy needs for fighter aircraft, numerous applications have been identified in other military systems and the commercial sector. Customers include Lockheed, Alliant Techsystems, Boeing, Aero-Consultants, Cabo Yachts, BF Goodrich, Ferrari Automotive, Motorola Cell Phones, and Cardio West, which manufactures artificial hearts. Our Aquacore and Aquacast products developed in this program were recipients of the 2001 R&D 100 award. The Water Soluble Tooling NAVAIR SBIR program is now

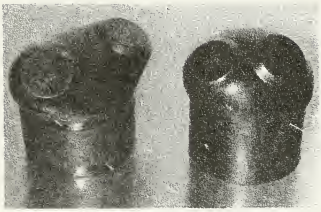
transitioning to a Phase III Indefinite Deliverable / Indefinite Quantity contract.

Combining the Water Soluble Tooling Technology with the earlier mentioned manufacturing technologies will enable the automated production of systems such as an Unmanned Air Vehicle (UAV) structural airframe made in a single piece. This technology can also be applied to low cost, high performance, one piece composite Unmanned Underwater Vehicles (UUV's) and other complex weapon systems such as a one piece composite missile casing. The technology is also applicable to building a new generation of one piece rocket motors and even small turbine engines.


Courtesy of:
Aero Consultants Ltd.
Switzerland
Example of a two-piece mandrel created with Aquapour™ and bonded with Aquafill™. Final OCP piece was sealed with Aquaseal™ (demonstration piece was sealed with laquer seal for better protection during shipment).
Part Specifications:
• Silicone Mold Used With Fiberglass
• Aquapour™ is Stamped to Form the Hollow Mandrel
• 10mm Wall Thickness
Customer:
Omni Carbon Products
Switzerland



Aquacore™ Water Soluble Composite Tooling



Artificial Heart Tooling

ACR is just one example of the small businesses that are succeeding through the congressionally mandated small business innovative research program (SBIR). I believe Congress established the SBIR program because it recognizes that small business creates most of the new jobs, and is the source of most innovation. This is simply because small businesses are not risk adverse, we have no choice. In order to stay competitive in today's business climate we must take risks. Our current times demand that the Department of Defense be willing to take more risks by investing in successful small businesses. I believe that the members of this subcommittee could assist the Department by providing adequate support personnel to the offices administering the SBIR funds, encourage expanded use of Indefinite Deliverable / Indefinite Quantity contracts for SBIR programs, and remove disincentives which deter the acquisition community from dealing with small businesses.

Again I appreciate the opportunity to testify, and I would be glad to answer any questions members may have.

Statement to the House Armed Services Committee's
Subcommittee on Tactical Air and Land Forces
(Small Business Innovative Technologies and Research)
By
Mr. Enrique J. Enriquez
President, Locust USA

Mr. Chairman, Ranking member, and members of the Committee, I am honored to be before you today on a topic that is very important to my company, and probably many other small companies. My name is Enrique J. Enriquez; I am the president of Locust USA, which is located in Miami, Florida. I have over 20 years experience with leading edge manufacturing entities such as Rolls Royce Ltd., Miami where I was in charge of Engineering Systems Developments and worked as a Project Leader on the manufacturing of the Sapphire Project (Star Wars) satellite structure. I pioneered CAD/CAM/CAE and was a CAD/CAM consultant for 10 years at Coulter Corporation a 6000 employee market leader in hematology equipment. I am an associate professor at the University of Miami and Florida International University. My responsibilities at Locust USA, Inc. include Technology Directive, Industrial Partnerships, Customer Relations and Corporate Finances.

I will tell you a little about my company, Locust USA, Inc. was founded in 1999 to develop and market advanced technology very small, high-speed turbine engines for the UAV/UGV, Extended Range Missiles, General Aviation, and Power Generation markets. Locust is a synergistic affiliation of three established South Florida companies, R.A. Microjets, Inc. (RAM) of Medley, Florida, Pegasus Engineering Services, Inc. of Juno Beach, Florida, and Mark Two Engineering, Inc. of Miami, Florida. Each has unique background and experience in the design and manufacture of turbine engines and other high technology components.

RAM was established in 1994 and was the world's premier manufacturer of low-cost model aircraft turbine engines. Their engines have been widely accepted by the model aircraft community with nearly 1000 engines sold over a five-year period. RAM has developed and successfully marketed 5 different models of turbojet engines from the 6 lb. Thrust Ram 350 to the 48 lb. thrust Ram 2000. In 2002, the owners of RAM decided to exit the model aircraft turbine engine business. Locust USA has picked up much of that work, although it is not a core business for Locust USA.

Pegasus Engineering was established in 1994 as a woman-owned high technology engineering services firm as the vehicle to retain an extensive cadre of high caliber engineering talent made available from the extensive early retirements and corporate downsizings carried out at Pratt & Whitney and other aerospace companies across the country. Pegasus propulsion designers and technologists have an average of 30+ years of experience in gas turbine systems.

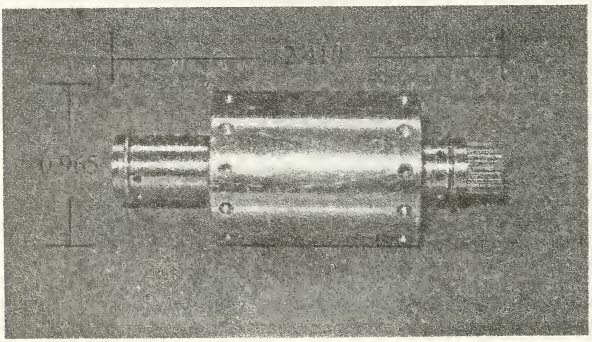
Mark Two Engineering, Inc. a company I co-founded in 1996 as an innovative manufacturing source specializing in creating complex models, prototypes and hard-to-

build parts for the biomedical, automotive and aerospace industries. Through a major capital investment and human resource development program, Mark Two has developed an unmatched CAD/CAM capability fully integrated with Pro Engineer™

The integration of these three team members (now two) into Locust, which have "*cutting edge*" technology, has already demonstrated large synergistic benefits as the development time for a new Locust engine has been reduced from the normal multi-year time period to only months. The L50 turbojet that was created for the model aircraft community was modified into a 50 hp turboshaft/turboprop by designing and adding a power turbine and gearbox. The time from design concept to a running engine was only 4 months. Today, Locust USA is able to initiate a new advanced technology engine design and enter initial engine testing in less than 18 months.

For the past four years, Locust customers have been the Army and DARPA. Army programs are mostly turboshaft engines for potential application to UAVs, ranging in power from 40 hp to just above 150 hp. The DARPA sponsored development is for the 5hp to 22hp turboelectric engines. We are not ignoring the other Services, at the present we have proposals into the Navy, but decisions on contract award have not been made as of this date. Our engines feature high-speed starter/generators that are capable of producing 2KW to 15KW in electrical power. In this regard, Locust has operated high-speed rigs to as high as 240,000 RPM. One such design was operated for the required 100 hours at 191,000 RPM. Our highest operating engine speed to-date is 140,000 RPM.

I mention these speeds because they are very important to our work. Most gas turbine engines in the field today are operating at speeds of about 70,000 RPM or less, but the laws of physics require our small engines to run at much greater speeds. There is a good and a bad side to the high speeds. The good part, you can rotate electric generator rotors at these high speeds to generate electrical power at greatly reduced size/weight. As an example, this rotor



is capable of developing about 4KW running at 190,000 RPM. Our new engine and generator, to do this, will weigh less than 10 pounds, operating with heavy fuels (jet fuel that is available on the battlefield). All of our engines run only with heavy fuels. To do the same with today's available equipment, will require a generator alone that will be several times the weight of our complete engine package, and the complete package will weigh several hundred pounds. What does all this mean to our Armed Forces? Lightening the Force.

Now the bad (but it's only a challenge to our team) side of higher speeds, shaft dynamics (critical speeds and vibration of rotating components), couplings that transfer the power of the engine to what the user wishes to accomplish, such as rotating a propeller, and reducing these high speeds to a usable speed for our customers. These challenges are real, difficult, and to our knowledge, not accomplished by others. We feel that we have the solutions in hand at this time. In part we were able to accomplish this by a series of small contracts, and especially, funding from the Congressionally mandated Small Business Innovative Research (SBIR) program.

Looking ahead we are concerned about the survival of some of the small key companies that we rely on for castings and bearings that are crucial to our products. As a small business, and now dealing with small numbers of units, we are having difficulty in locating companies that are willing to just talk to us, most large companies will not even listen to what our needs are. We have found a few small companies that are located in Florida, Pennsylvania, and California that are willing to work with us. They have done an excellent job for us, but in some cases we are seeing signs of distress with a few companies, their current business base is dwindling and may force them to exit the business.

So far I have spoken about issues that we are resolving; there are a few areas that we cannot fix by ourselves. One such area is related to military requirements for heavy fuel burning engines as they may apply to UAVs. The military has clearly established their need for heavy fuel burning engines for UAVs, but industry has been slow to respond to this need. In the small size range that we are working in, the military requirements are in place requiring heavy fuel burning engines; however, these requirements are being placed on the aircraft developer. The expectation is that they will deliver a product that has that capability; I have not seen that milestone accomplished. There are a few reasons for it:

- Airframe companies are not in the engine business, plus they lack the specific propulsion expertise. The Military Services have the expertise, and work directly with the propulsion industry.
- The usual approach has been, to develop a diesel engine, but in the meantime use a gasoline engine. Problems develop in the airframe side of the program requiring resources to fix. Propulsion suffers again and heavy fuel engines are not adequately pursued.

The Military Services learned many years ago how to resolve this problem. Practically every military aircraft flying today has a Government Furnished Engine (GEE). This takes the responsibility away from the airframe developer and places it in the hands of

the Services and the propulsion industry, where it should be. I believe this approach must also be used for UAVs if we are going to achieve heavy fuel burning engines in a timely fashion in order to assure that the warfighter's needs are met.

I want to thank you for inviting me here, and for listening to my comments. I will be glad to try to answer any questions that you may have.

SecuriMetrics
INCORPORATED
Advanced Biometric
Security Solutions

Statement of Greg Peterson
Chairman and CEO, SecuriMetrics, Inc.
Before The Tactical Air and Land Forces Subcommittee

July 21, 2004

Good Afternoon Chairman Weldon and Members of the Subcommittee.

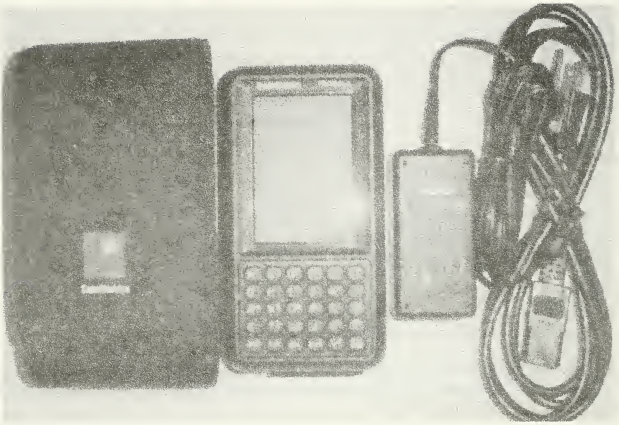
My name is Greg Peterson and I am the Chairman and CEO of SecuriMetrics, Inc. I consider this opportunity to testify before the Subcommittee a great privilege and would like to thank you for inviting me.

SecuriMetrics is a small business located in Martinez, California and we currently employ 16 highly trained software and hardware engineers and program management personnel. I am pleased to note that we will be increasing our workforce to around 25 people over the next few months due to a contract we have just recently signed, which I will discuss in a moment.

Our general area of business is as a biometrics-oriented, security solutions provider, and we have operated in this capacity since 2000. The scope of our biometrics expertise spans the range of portable, stand-alone technologies (our key expertise is in iris recognition) to portable, multi-modal technologies (e.g., the combination of iris, fingerprint and face recognition technologies in a unified format).

One of our primary areas of focus is supplying hardware and software to the U.S. Military and to other U.S. Government agencies concerned with issues relating to counter terrorism, homeland security and border control. We are also supplying equipment and software to State and County agencies in Colorado, Texas, New Jersey and Oklahoma in the areas of Law Enforcement, Corrections and Emergency Response.

Over the past 5 years, SecuriMetrics has internally funded and devoted the majority of our intellectual resources to the design and development of the Portable Iris Enrollment and Recognition (PIER) device (photo below). The PIER is a small (3 ½" x 6" x 1 ¾"), light-weight (13 ounces), full-function biometric device. In response to early interest and support expressed by the Army in our portable iris technology, we tailored the current version of the PIER device for use by the military. It is currently in use by the Army, Marine Corps, Navy and Special Forces in Iraq, Afghanistan, Cuba, Bosnia and other locations.



PIER and supplied accessories
Belt Carrying case, PIER 2.3, AC power adapter and power cord

SecuriMetrics is also the designer and developer of the Multi Modal Biometric Demonstration (MMBD) system (photo below). This system is a physical and logical integration of multiple-image capture devices (including the PIER) for iris, face and fingerprint biometrics and a notebook computer. The system enables a user to enroll biographic and other information for an individual and to associate the captured biometrics with this information. Subsequent to enrollment, an individual may be identified with a high degree of accuracy and the associated information, including a photograph, displayed.

The MMBD is a precursor to a portable, multi-modal hand-held device for which we have just received a development contract. The multi-modal hand-held device development project is partially funded by a consortium of government agencies including the Army Intelligence Battle Lab at Fort Huachuca, Arizona. With the support of The Battle Lab, SecuriMetrics received funding that was added by Congress in the FY 2004 Department of Defense Appropriations Act. Additional funding was obtained through a consortium of other interested government agencies. Full-scale development of the multi-modal hand-held device has just begun (July 2004), and we expect to complete this project by the second quarter of 2005.

Multi-Modal Biometric Demonstration (MMBD) System

The fiscal year 2005 Department of Defense Appropriations Act contains additional funding to continue our development of this and related technologies for use by the U.S. military and other government agencies and will include the development of currently unavailable advanced platforms and capabilities. The project to be supported by these funds is under the sponsorship of the Military Intelligence Battle Lab at Fort Huachuca, Arizona.

Mr. Chairman, with your permission I would like to demonstrate our PIER and MMBD products.

<Pause for demonstration>

When I founded our company in 1999, I never dreamt that our products may be of potential help, even in a small way, in securing the safety of our Country or the safety of the members of our Armed Forces. The hope and possibility of making such a contribution is and will always be one of the highlights of my life.

This concludes my remarks, and I look forward to your questions.

House Armed Services Committee
The Tactical Air Land Forces Subcommittee

Thursday, July 21, 2004 – 3:00pm – 2118 Rayburn – Open

Testimony by

Dr. Alexander D. Stoyen
Founder and Chief Executive Officer
21st Century Systems, Inc.®

Chairman Weldon, Congressman Abercrombie, members of the Subcommittee, I am honored by your invitation and offer the following testimony into the record:

My name is Alexander D. Stoyen, and I am the Founder and CEO of 21st Century Systems, Inc.® 21st Century Systems is a pioneer in intelligent agent based decision support software technology. An eight year old DOD contractor, 21st Century Systems, Inc. is applying its revolutionary technology to a wide spectrum of mission-critical systems, from dismounted soldier to Navy ships to Command and Control centers.

Background: 21st Century Systems, Inc.'s Technology

Before I share with you our very positive experience as well as opinions on the way ahead with the Small Business Innovative Research program, let me first explain what our technology is.

Today, it is fairly well understood what humans are good at and what are some of the basic limitations of human cognition and decision making. While humans possess exceptional "big picture" thinking and intuition, they are severely constrained in the volumes of unstructured data they can process. Humans also need patterns to discern what matters and how to then prioritize tasks under time constraints. On the other hand, it is also fairly well understood to what extent computer software can be used to fully automate a decision process. Software is endowed with exceptional computational prowess. Software can look for patterns in seemingly unstructured data, while not needing to find a pattern for comfort (the way humans do). On the other hand, software lacks human intuition and may engage in arbitrarily long "thinking" without realizing it.

Having understood well the strengths and weaknesses of both humans and computer software, 21st Century Systems, Inc. believes that humans and computer software working together can do better than either one alone. We accomplish this task by inventing very special software to support human decision makers. This software is based on intelligent agents, which are software components capable of both reactive and proactive intelligent behavior, learning and interaction with humans, other intelligent agents and a wide variety of information and data sources, such as combat system data flows, sensors and other information flows and devices.

Our intelligent agents perform a wide variety of tasks: proxy for human or other entity, data collector, fusion and reconciliation, arbitration and – very importantly – assisting humans in their decision processes. A typical intelligent agent or team of agents will bring in data from a variety of sources, then scale, convert and otherwise fuse the data, and then prioritize it and deliver it as appropriate to the human

partner, with the appropriate recommendations for the subsequent course of action. Agents also engage in extensive background analysis and exploration of alternatives, through an extensive array of heuristic algorithms, Game Theory, Devil's Advocate and What-If?-analysis, and other applied mathematical methods.

While there are a number of products available that essentially collect and deliver the data to a single display or screen, we consider these products to be not only of limited use but downright counter-productive. Human decision makers are already often flooded with too much "raw data". These other products merely present the same "raw data" in a different, more aesthetically pleasing fashion. The mere fact that the data are now "prettier" does not take away from the fact that the human decision maker is still overwhelmed and that the data are still not properly organized. As a result, the human decision maker in a time-critical situation likely will not be able to process mission-critical information – possibly missing crucial pieces of information – with potentially disastrous results. By stark contrast, our agents bring to the human decision maker what is needed, when it is needed and in the form that is needed.

Our intelligent agent based decision support technology has been captured in a commercial product called the AEDGE® or Agent-Enabled Decision Guide Environment. AEDGE components provide the abstractions of agents and all their interactions and other operations. The AEDGE is openly architected and allows easy management of components, including export of our components and import of third party components. This approach makes it very easy for the AEDGE to connect and otherwise interoperate with other systems, including much older legacy "stovepipes" (e.g., combat systems, simulators and trainers, sonar sensor suites). Essentially a decisions support system "toolkit", the AEDGE already incorporates our extensive know-how, making is orders of magnitude easier to build a particular decision support system (DSS) – say, a DSS to support a Tactical Action Officer (TAO) aboard an Aircraft Carrier – using the AEDGE toolkit than to build such a DSS from scratch.

21st Century Systems, Inc.'s products have application across the full spectrum of mission areas. Our decision support software can be used when one has too much information, not enough information, uncertainty of information, in real-time situations, post-op, tactical or security, and so on. Some of the representative SBIR Phase III applications of our adaptive technology are as follows. The Consolidated Undersea Situational Awareness System (CUSAS, **Figure 1**) focuses on decision support under uncertainty, for the Submarine Fleet. The Advanced Battlestation with a Decision Support System (ABS/DSS) provides tactical decision support for command and control personnel aboard Aircraft Carriers. A CUSAS variant, Shipboard Automated Reconstruction Capability (SHARC) is going to provide Navy platforms (beginning with the Virginia class submarine) with mission reconstruction and training tools. SituSpace (**Figure 2**) provides a Single Integrated Space Picture for the Army and (under consideration) Joint space operations. HiRSA, or High Resolution Situational Awareness (**Figure 3**) is being fielded in August with the 1 Marine Expeditionary Force in Iraq beginning in August, and provides a high-resolution 3D command and control platform for urban tactical operations. ExLoG21 provides the intelligent decision support capability for autonomic logistics systems, supporting expeditionary logistics operations. SentinelNet creates a fused, intelligent network of sentries, sensors, computers and command and control center personnel, and will provide Anti-Terrorism/Force Protection command and control for Navy ships and shore installations. SASA provides weapon-target pairing and automated ingress/egress routing for tank crews. Webster is an intelligence analysis tool that continuously monitors, interprets and correlates web-based open source information, providing analysts with correlated hypotheses on terrorist activities occurring worldwide. I hope these project snapshots give you an idea of the wide variety of applications and implementations we have been able to achieve with our software as a result of the SBIR process.

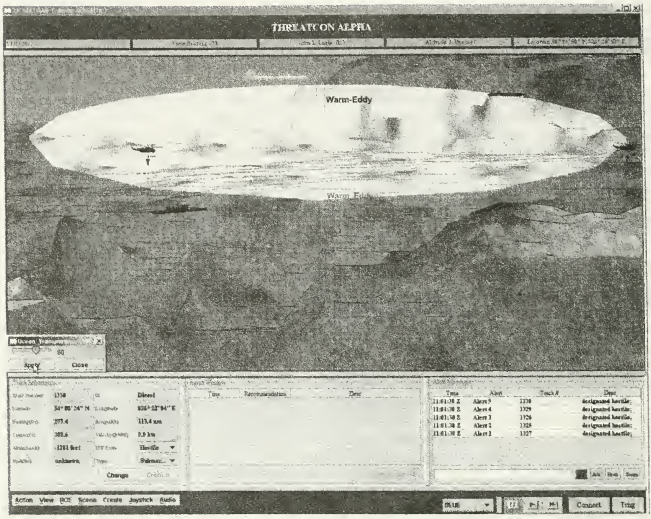


Figure 1. CUSAS

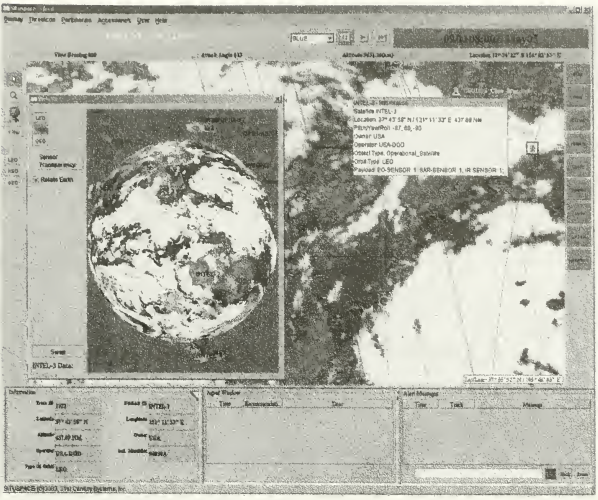


Figure 2. SituSpace

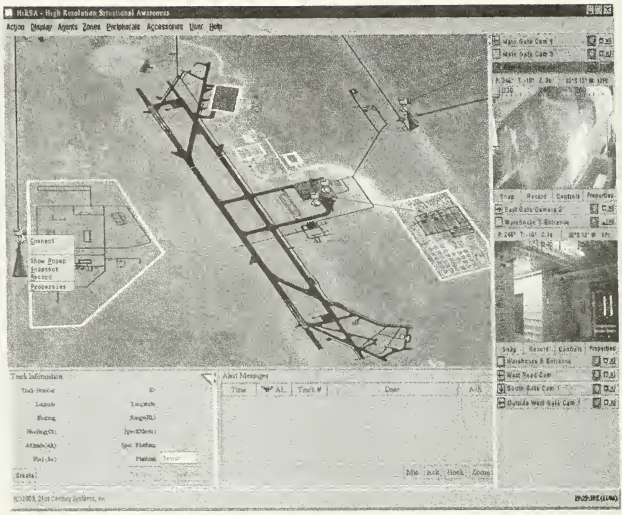


Figure 3. High Resolution Situational Awareness (HiRSA)

21st Century Systems, Inc. and the Federal SBIR Program

No Federal program can (or should) be sufficient to create and keep on "feeding" a business. Every company worthy of mention starts with an idea that should come from the entrepreneurs who start it, not the Federal Government. 21st Century Systems, Inc. is no exception. Computer Science founders have established theoretical limitations on what computers can do alone, but they never ascertained how these limitations can be pushed by humans and computers working together. My idea therefore was to start a company to find out just how much more can be accomplished by humans and computers (or more precisely, intelligent computer software) working together, than by either one alone. This is why 21st Century Systems, Inc. was started. Obviously too, one has to be insane to start a high-technology company without any idea of how its technology will in fact be pursued and delivered to eventual customers. Thus, without any help from the SBIR program, I and those who joined 21st Century Systems early on already had the fundamental scientific underpinnings of our technology and of the basis of our software (the AEDGE) worked out. And for completeness, let me add that this basic research and the AEDGE ongoing evolutionary design and development have always been an IR&D activity, not a DR&D activity at 21st Century Systems, Inc.

However, no company can exist on ideas and technology alone. Customers are needed and the technology must be cast into the form that each customer would benefit from and therefore would consider paying for. 21st Century Systems, Inc.'s customer is the Department of Defense. DOD acquisition programs are typically long-lived, highly complex undertakings. It takes a major effort, in time and resources to learn and understand what these programs need. A very real issue for a small business is: How does one meet payroll while learning about the customer and before there are any real sales?

Enter the SBIR program. Today, this three-phase program is the best if not only fair and open way to meet one's payroll while trying to apply one's technology to a particular customer need. Learning about the customer has to be part of the undertaking. Obviously, not every company can be taught successfully, nor is every technology necessarily of eventual use to the Federal customer. Moreover, no company should be paid indefinitely to learn, without some reciprocity and delivery of a useful product to the customer. Most small high-technology companies will, in fact, not succeed in the SBIR program. Many will fail promptly and in no uncertain terms. A number may become life-style companies and "hover" at a life-style level of funding for a while, without transitioning, thus ultimately failing. Still, the best will survive, excel and eventually thrive.Based on extensive observation and experience, I can say with near absolute certainty: the companies that do succeed in the SBIR program are the most innovative, agile and competitive in the Nation. And I can also say with near absolute certainty that without the SBIR program these companies likely would have never delivered any of their technology to the Federal customer.

21st Century Systems, Inc.'s own experience with the SBIR program, predominantly in the DOD, has been very positive with awards from USAF, USA, USN, OSD, DARPA and SOCOM. We received funding for a Phase I SBIR in our first year of operations. The work never went to Phase II but we had an opportunity to show what we were doing to a number of eventual customers, who next funded us for more Phase Is, eventually Phase IIs. While this funding enabled 21st Century Systems, Inc. to maintain very modest operations and even meet payroll, we recognized early on that the DOD end users are not those folks immediately associated with the SBIR work. The end users are our soldiers, sailors, airmen and marines. With the strong blessing and support of our SBIR program managers, we therefore went to the end user – the warfighter – to find out what they thought of our work. The warfighter very much liked our technology and wanted the it fielded as soon as possible. With this message in hand, we went back to the program managers.

We soon found out that while not every program manager in the DOD thinks equally highly of the idea of accepting technology from small businesses, a number of them did approve of this and were willing to give us a chance. That number has grown over the past few years and our work is now transitioning very well – as DOD Phase III SBIRs – into various DOD acquisition programs. The majority of these programs are in the Department of the Navy (including USMC) and a growing number of very significant transitions are now in the Army. We fully expect our first Air Force Phase III possibly in FY04 and certainly no later than FY05.

Consolidated Undersea Situational Awareness System: An Example of a Successful SBIR

To illustrate how 21st Century Systems, Inc. pursues SBIR work, I would like to provide an example of one of our very successful SBIR programs, namely Consolidated Undersea Situational Awareness System (CUSAS). CUSAS started as a DARPA Phase I SBIR and transferred to the Navy for Phase II (and now Phase III), to provide the Submarine Force with suitable tactical decision support. Given the nature of sensors (predominantly sonar) aboard submarines, CUSAS has to provide decision support under conditions of both massive data inflow and extreme uncertainty in the data. We have worked closely with the submarine community. Commander Submarine Force Pacific at Pearl Harbor, Hawai'i, has advocated very strongly for CUSAS' development, experimentation and fielding. CUSAS' baseline intelligent agent training is based on submarine doctrine and tactics provided and kept by the Submarine Development Squadron 12 at SUBASE Groton. The Office of Naval Research (ONR) that manages CUSAS has enabled all official provisions and government furnished information, and has worked closely with Naval Sea Systems Command (NAVSEA) to find an official transition home for CUSAS.

In turn, the Navy Program Executive Office Integrated Warfare Systems (PEO IWS) at NAVSEA has accepted CUSAS into its acquisition programs, in the Undersea Warfare Systems area (PEO IWS 5). The CUSAS Phase III is occurring in parallel with the Phase II still active. This technology will be in the hands of the warfighter many years before any other Federal program could have discovered, grown and fielded it. CUSAS is inexpensive. Furthermore, evaluations of our technology have shown that warfighter's function is considerably enhanced and manning requirements reduced by the technology. Once fielded, therefore, CUSAS will result in additional savings due to increased performance and reduced manning requirement as well.

In addition to the obvious benefits to the Navy (and the taxpayer) presented above, CUSAS has a number of other benefits. One of these is the excellent relationship between 21st Century Systems, Inc. and the University community that CUSAS funding has facilitated. One outstanding example of this is our discovery of a unique (and largely unfunded by Federal programs) expertise at the University of Hawai'i. Specifically, in the College of Social Studies at the University of Hawai'i there is expertise in modeling how culture affects decision making. Through a subcontract from the CUSAS SBIR to the University of Hawai'i, a very fruitful collaboration was struck. Near future generations of CUSAS will include and field "culture" DSS modules. A US submarine commander will be able to predict much more accurately how a foreign counterpart may react to relevant tactical situations. Cultures play significant role in this process. A foreign CO will not necessarily act the way a US doctrine and tactics would prescribe. Obviously the submarine-relevant modules will be classified. Yet an unclassified subcontract continues to pay for basic research – harvested thus indirectly but very effectively by the DOD – by outstanding university faculty and graduate students.

How Can the SBIR Program be Improved Further?

Today 21st Century Systems, Inc. is a Navy and DARPA SBIR Success Story. Our DOD SBIR Commercialization Index (meaning transition through Phase IIIs) is 100%. We believe that, as the DOD realizes the vital importance of applying intelligent decision support systems to the practice of modern warfare, our technology will be eventually fielded into nearly every platform in the DOD, and across all Services in the next four to ten years.

Yet I would be remiss in what I have been invited to talk about today if I did not provide some suggestions as to how the already very strong and well-working SBIR program can be made even stronger. My remarks will continue to be limited primarily to the DOD SBIR Program and to our technology area (which is part of a larger area, namely Information Technology).

Improve Links Between SBIR-Funded Programs with Acquisition Programs. One observation is that not all DOD SBIR component programs are of equal strength. The issue is absolutely not for lack of trying, but rather, in the fact that each program is organized differently. From our point of view, the Navy SBIR Program is run extremely well because it makes a significant effort in identifying transition and commercialization opportunities early on in the SBIR lifecycle. The Navy program is run by the Office of Naval Research (ONR), in close collaboration with the Naval System Commands (SYSCOMS: NAVSEA, NAVAIR, SPAWAR and others). Since the ONR and the SYSCOMS are, respectively, the R&D and the acquisition arms of the Navy, such collaboration is a very good way of running the SBIR program. To provide for cross-pollination of technology suppliers and those who demand it, the program runs a unique year long undertaking, the Technology Assistance Program (TAP). Not surprisingly, the first 21st Century Systems, Inc. Phase III was awarded by the Navy and Navy Phase IIIs remain in the clear majority of all our Phase IIIs. It would be a mistake, however, to say that the other Services do not pursue their SBIR programs with rigor. We have been awarded funding from most other DOD components. In the Army, we now have a growing number of very significant transitions. These are coming to us directly from Army's own PEOs and acquisition programs. It is significant to note that the CUSAS program discussed earlier originated at DARPA before it was transferred to the Navy. A number of our transitioning (into Phase III) SBIRs are funded in Phases I and II directly by the OSD, Homeland Security and other Service-independent organizations, but are managed by the Navy. We therefore believe that if every Service were to effectively link SBIR management with acquisition program management, their SBIR transitions would increase and the program would be even more successful.

Educate Acquisition Community on SBIRs. Another area of improvement and one that would be beneficial across the Services, is educating the acquisition management community about the SBIR program. This subject must be made part of this community's formal education and certification, in the Defense Acquisition University curriculum, at every level, and mandatory for advancement. At their Level 3 certification, these professionals should be experts on not only acquisition in general but SBIR Phase III acquisition. Today this community often has trouble understanding that Phase III is both post-compete and considerably less expensive than alternative sources.

Educate Acquisition Community on Information Technology (IT) and on Small Businesses As Major Sources of IT Innovation. In the Information Technology sector, we have an additional educational barrier. The acquisition community does not fully understand that innovative technology in the IT sector has always come from three sources: corporate research divisions of major IT corporations (such as IBM Research, Xerox PARC or AT&T Bell Labs), small businesses and, somewhat modestly (due to their preference for basic research as opposed to applied research and technology) universities. Thus, innovative technology has not come traditionally from system integration divisions or Federal

sector divisions. Yet today the acquisition community purchases innovation predominantly from large IT integrators. In doing so, they are not getting much innovation and are furthermore blurring the boundaries between innovative technology and technical services. One good example of how blurred the boundaries have already become is in the fact that every program or contract officer understands work for pay but many have trouble understanding software licensing (Yet the latter is a core concept in software product sales).

Rapidly Accelerate Insertion of SBIR-Funded Information Technology. Another observation of possible benefit to the DOD SBIR program is that Information Technology (IT) evolves far faster than many other technologies. Today, it takes two to four years to start a new program, and then enter into a POM'ed six year FYDP. Such a cycle is probably fine for building hulls and reactors, but not IT. In six to ten years IT undergoes multiple generational changes. Thus, DOD should consider considerably more rapid, "just in time" Information Technology acquisition. 21st Century Systems, Inc. found some program managers – such as in the NAVSEA PEO IWS 5 as mentioned earlier – who are willing to try such rapid insertions. Still, this is not an easy task for these program managers to undertake. A program office that would be dedicated to rapid insertions of relevant areas of IT – with strong support from the SBIR program managers (such as in ONR) – would be an even better way for the DOD to acquire this technology. Perhaps a pilot program office of this kind could be tried in PEO IWS 5 or elsewhere.

Create DOD-Small Business Enterprise Exchanges. I would create an exchange program between senior DOD technology and acquisition leadership and small innovative business executives (much like the IPA program works today at DARPA, ONR and the NSF, though I would emphasize acquisition commands for the government side of the program).

Make SBIR Technology Insertion A National Priority. To level the existing playing field with large integrators, we would strongly welcome a Presidential Executive Order, a Resolution of Congress or better yet both to make SBIR technology insertion into DOD acquisition programs a priority.

Permit Flexible and Practical Data Rights for SBIR Technology. DOD should specifically authorize flexible data rights authority and negotiations by DOD officials with SBIR firms, so that data rights can be quickly and efficiently adapted to each weapons program (instead of forcing DOD officials to deal with the "One Size Fits All" prescriptions in today's DOD data rights clauses).

Conclusions

The SBIR Program is the most effective way to secure first-quality technology meeting government customers' needs while allowing small enterprises like ourselves to remain viable. We have experienced a number of shared positive results from the SBIR process that should be articulated in this important evaluation. First, the SBIR process often fosters a durable relationship of professional trust between the developers of technology and the DOD customers. In the traditional procurement process, this is often a problematic hurdle because of the size and complexity of contracts involving large integrators. The closer professional understanding allows the technology development to occur through a far more collaborative and cost-effective scenario, one that often becomes more flexible and responsive to customer needs.

Second, I submit to you that the SBIR process allows for more accountability of funding for research. Because contracts are more discreet, and customers have flexibility to guide the R&D to meet their priorities, one can honestly conclude that in a variety of ways, government is getting more return on its

investment in technology through SBIR Further, no scientific study is needed to appreciate that many SBIR companies are highly entrepreneurial, very efficiently run, with a minimum of overhead.

Third, the SBIR (and STTR) paradigm, encourages and embraces the development of relationships with universities and non-commercial research institutions. These relationships in turn facilitate rapid and timely inclusion of cutting edge basic research into innovative, practical technology.

Fourth – and I mean no disrespect to the distinguished legacy of our nation's major research institutions – we have learned first-hand that many of our most talented young technologists and researchers have opted for the small business environment, high-energy, very personal environment over a large bureaucracy. One need only survey the exciting array of SBIR participating companies to see how wonderfully effective we have been in attracting some of America's sharpest young minds who thrive in this kind of workplace.

In brief, the SBIR Program is already a winning formula for the triumvirate of beneficiaries to its long-term success: The taxpayer, small business and the Federal government. Thus, my considered recommendations for improvement of this already stellar technology innovation program are offered for the further benefit of this troika, such that the DOD SBIR Program will thrive even more.

Given the decreasing R&D budgets or large corporations since the late 1980s, and as someone with extensive R&D experience in all of large corporate research, academia and small business, I am of the strongest and well-founded, expert opinion that the most innovative IT now comes from small businesses. I started in large corporate research and then left for academia. I then left a tenured, endowed full professor position to run 21st Century Systems, Inc. Luckily for me, 21st Century Systems, Inc. has enjoyed exceptional success. With all sincerity I can say that very much of this success is fully attributable to the DOD SBIR program. Thank you for this exceptional program and thank you for inviting me to share our SBIR experience with your Committee.

Biographical Summary

Dr. Alexander D. Stoyen is Founder and CEO of 21st Century Systems, Inc.® (21CSI®). Previously, he was an Endowed Full Professor and Director, Center for Management of Information Technology at the University of Nebraska at Omaha and the Peter Kiewit Institute of Information Science, Technology and Engineering. Dr. Stoyen's prior appointments have included the IBM T. J. Watson Research Center, the IBM Zurich Research Laboratory and the New Jersey Institute of Technology. An accomplished technologist and researcher, he is well known for his work in decision support systems, real-time systems and languages, distributed programming environments and remote procedure calls, and in engineering of complex computer systems. An IEEE Computer Society Golden Core Member, Dr. Stoyen holds a Ph.D. in Computer Science from the University of Toronto. He can be contacted at Alexander.Stoyen@21csi.com.

Charles E. Harper, Chairman, Sierra Monolithics, Inc., Redondo Beach, CA
Statement before the Tactical Air and Land Forces Subcommittee
House Committee on Armed Services
July 21, 2004

I am Charles E. Harper, Chairman and Co-Founder of Sierra Monolithics, located at 103 W. Torrance Boulevard, Redondo Beach, CA. Sierra was formed in 1987 by two former employees of Magnavox. Sierra, originally an 8(a) firm, is currently a venture backed dual use technology company. We have about 50 employees. Our products range from aerospace/defense systems such as Unmanned Air Vehicle (UAV) Data Links, Electronic Warfare receivers, RFID Tags, and Millimeter Wave Transceivers to commercial integrated circuit (IC) products for 40 GBIT optical communications, WiMax transceivers, millimeter wave data links, automotive radar, and satellite TV receivers.

Sierra's extensive technology base stems from its early participation in the Small Business Innovative Research (SBIR) program. From 1988 to 1998, Sierra was awarded ten (10) Phase I's, six (6) Phase II's and one (1) Phase III. However, one cannot build a sustainable business on multiple Phase I and Phase II awards. There has to be a potential transition path from Phase I to Phase III and production. Sierra's SOCOM Phase III award (Miniature Multi-band Beacon -- MMB) had a clear product path if the product developments in Phases I and II were successful.

Sierra Monolithics is manufacturing the Miniature Multi-band Beacon (MMB) under an $18 million SOCOM IDIQ type contract. $6 million in contracts have been received to date. This Phase III award was one of only three Phase III's awarded to a small business by SOCOM. The MMB's are used in support of Global War on Terrorism (GWOT) missions. They are currently deployed in Afghanistan and Iraq, and we receive calls weekly from units deploying to those theaters inquiring about securing the beacons.

The MMB is a small, lightweight, hand portable and/or vehicle mount transponder beacon used to identify friendly forces and as a point designator for accurate delivery of ordnance by close air support aircraft against immediate or preplanned targets, enroute navigation and drop zone marking. When the Microponder™ receives a radar signal in I- or J-band, it intelligently discriminates and creates a reply pulse train in the received band coded for the radar to identify and locate the transponder. The beacon operates with a wide range of aircraft (F-15, F16, B-1, B-52, C-5, AC-130, MC-130, MH-53, MH-60, HH-60D). Sierra Monolithics has shipped more than 1400 of its SMP-1000 (Single Mode) and SMP-2000 (MMB) hand held radar beacon units to the Air Force, Army, Marines, and Special Operations Forces. As the MMB has been deployed in the field, the operators have also recognized that, in addition to providing a navigation point, it inherently provides an anti-fratricide capability protecting the users on the ground against friendly fire. SOCOM has 336 of the units on its Unfunded Requirements list.

Sierra is also developing the next generation MMB, reducing the size by 50 percent and cost by a corresponding 60 percent. The next generation MMB will incorporate Sierra's proprietary Silicon Germanium (SiGe) integrated circuit chipset.

Today's hearing is important in highlighting the challenges small firms like Sierra encounter as we move through the SBIR process to provide needed technologies to forces in the field. Thank you very much for this opportunity to participate today.

DOCUMENTS SUBMITTED FOR THE RECORD

JULY 21, 2004

CURTISS WRIGHT Controls, Inc.
Embedded Computing

VISTA Controls DOD Experience

Who is VISTA Controls?

Recently considered a small business DOD contractor, through organic growth and acquisition, VISTA Controls is now part of a much larger company – the Curtiss-Wright Corporation. The legacy of the Curtiss-Wright Corporation is one of relentless technological innovation that traces its direct origins over a century ago to the very first manned, powered flight at Kitty Hawk. Curtiss-Wright has been leading the way ever since that historic day, and now the Corporation has laid the foundation for the future by unifying with the business units of VISTA Controls, Peritek, Primagraphics, Systran and Dy4 Systems to create the Embedded Computing organization of Curtiss-Wright Controls.

Alone, each of these companies boasts a history of over twenty years leveraging leading edge COTS (Commercial Off-The-Shelf) technology and delivering to the defense and aerospace industry, with reputations built on providing proven, state-of-the-art, open systems architecture commercial and rugged boards and chassis for the embedded computing market. VISTA Controls was one of the very first, true military COTS suppliers, leading the development and standardization of today's standards-based computer architectures. Combined to form Curtiss-Wright Controls Embedded Computing (CWCEC), they have become something more than the sum of their parts.

For system integrators, CWCEC offers a single source for commercial and rugged grade, open architecture COTS and application-specific computing solutions – solutions that span the full range of embedded system technology from board-level products to fully integrated subsystems.

VISTA Controls focus on our customers needs to relieve scarce, internal resources to develop military-qualified hardware. We accomplish this by drawing upon both our own, and the combined resources of other CWCEC companies, to provide hardware platforms integrated with software including Built-In-Test, along with tested and certified real-time operating systems. These subsystems are then ready to host our customer's application software, delivering unmatched service and virtually unlimited hardware solutions. And all these resources are backed by one of the defense and aerospace industry's most respected and innovative suppliers – the Curtiss-Wright Corporation.

Applicable Technologies

Exponential growth in performance and capability of electronics technology can, and is being passed through not only to weapons systems, intelligence gathering and communications, but also to reduce potential threat elements that can put our war fighters in harms way.

Starting with COTS

CURTISS WRIGHT Controls, Inc.
Embedded Computing

To provide our customers access to the highest performing technology available, our designs begin with leading edge, Commercially-available Off-The-Shelf (COTS) technology based on industry standards and open system architectures. VISTA Controls provides a single point of access for application engineering, sales, marketing, technical and programmatic support. Both commercial and rugged board and system customers now have access to the full range of design, development, qualification and deployment expertise of all the component companies of the Curtiss-Wright Corporation.

Established COTS supplier to the DOD

A key element to VISTA Controls success is the understanding of both our customer's and the program's needs and providing not just a product, but a solution. The word "solution" has been vastly over used by system suppliers; but for VISTA Controls providing solutions is a reality. Since it's inception in 1985, VISTA Controls has developed and grown with the concept of providing electronic subsystems for military programs based on open system, standards-based COTS computing architectures. That process has enabled us to understand the needs and complexity of the support necessary to make the program successful; not only at the programs introduction but through the program's entire life-cycle resulting in lower program implementation costs.

Headquartered in Santa Clarita, CA and with operating units in Littleton, MA, VISTA Controls provides system integrators with access to a true end-to-end supplier, with technology leadership in every aspect of advanced system design, including:

- State-of-the-art packaging and conduction cooling
- High speed serial and data fabric I/O
- High density computing
- Specialized enclosure design
- Custom and component engineering services
- Complete life-cycle support and programmatic services

VISTA Controls also offers the industries most complete, and innovative product and integration services with proven program expertise in hardware and software development, enclosure design and cooling technologies, specializing in:

- Mission Computers
- Fire Control Subsystems
- Imaging, Actuation and Stabilization Subsystems
- Ammunition Handling Subsystems
- Flight Control Computers
- Vehicle Management Subsystems, and more…

Defense and Aerospace program experience

Innovative companies like VISTA Controls convert technologies found in every day commercial applications into products that are actually utilized in military environments today. VISTA Controls transforms the latest generation, highest performance processor silicon into DOD computing subsystems for programs including:

- Avenger (Pedestal Mounted Stinger)

CURTISS WRIGHT Controls, Inc.
Embedded Computing

- RQ-4A Global Hawk
- M1A2 MBT (Main Battler Tank)
- M2A3 Bradley Fighting Vehicle
- EFV (Expeditionary Fighting Vehicle)
- C4I FBCB2 (Force XXI Battle Command, Brigade-and-Below)
- M1128 Stryker MGS (Mobile Gun System)
- FCS (Future Combat Systems) vehicles
- P-3 Orion ASW aircraft

DOD programs of this caliber are key to not only VISTA Controls' long-term success, but more importantly the program's success and effectiveness to the war fighter.

VISTA Controls is one of the largest suppliers of ruggedized embedded computing subsystems for our defense and aerospace customers. Since the 1980s, VISTA Controls has supported the industry's leading prime contractors in numerous applications and a variety of ground, naval and airborne programs with customers that include:

- BAE Systems
- Boeing
- DRS
- GE
- General Dynamics
- ITT Industries
- Lockheed Martin
- Motorola
- Raytheon
- Smiths Industries
- Telephonics
- United Defense
- and many others…

Significant advantages of our products and services

Latest Technologies

One of the most important elements that a company like VISTA Controls brings to the military, aside from the obvious of the latest technology, is the ability to mange technology obsolescence. The exponential growth in the technology available is a double-edged sword. One of the key industrial advantages that the United States has is it's ability to turn ideas into reality very quickly; that process produces a very short life span for many electronic components, a fact that can confound many military programs. Having the ability to manage this issue is now more than ever, crucial for the long-term success of both today's and tomorrow's military programs.

Customization, design and support services

CURTISS WRIGHT Controls, Inc.
Embedded Computing

When a program requires a solution that goes beyond COTS, VISTA Controls can repackage our existing open systems architecture COTS hardware and software products into unique, customer-specific form-factors to solve the most difficult legacy subsystem upgrades, and mitigate risk by reducing development time and program costs. We are the industry leader in defining and delivering programs that meet unique requirements and ensure product life-cycles to meet the most stringent long-term program needs. VISTA Controls has also developed obsolescence mitigation and technology insertion programs that make it a leader in this field.

Ease of integration

With the ability and knowledge of the industry's leaders at its disposal, VISTA Controls has the capacity to take an embedded system customer from any given design starting point and support them through the entire integration process, from board-level to fully integrated subsystems as their program or application requires. It's a unique ability – one that offers our customers a unique advantage. And it's one more way that we put innovation in motion.

Obsolescence management and lifecycle support

For our customers that require enhanced services including custom engineering, obsolescence and life-cycle services, we've developed a comprehensive obsolescence management programs tailored to meet specific needs. Our technology management and technology insertion programs manage operation, sustainment and reduce life-cycle costs. Approaches to obsolescence management include, but are not limited to;

- Data Package Management
- Component device and die banking
- Requalification testing
- Legacy electronics parts re-design
- and the manufacture of Form-Fit-Function Line Replaceable Units (LRUs).

Software and application engineering

VISTA Controls work closely with our customers to deliver market-leading software applications expertise and innovative product solutions. When our customers require, VISTA Controls' application engineers will guide customers through their application code development process, including real-world, hands-on expertise for a wide variety of environments including all of the leading embedded industry operating systems.

Realizable Lower Costs

Working with the DOD through the prime contractors from a programs outset enables VISTA Controls to offer the most appropriate technology and product for the need; resulting in the most cost-effective solution.

Companies like VISTA Controls develop electronic building blocks based on COTS, internationally adopted standards-based technologies that represent a vast available inventory for the DOD and primes from which they can select to assemble an electronic subsystem processing unit that fulfills our customer's and the war fighter's needs. These building blocks are developed

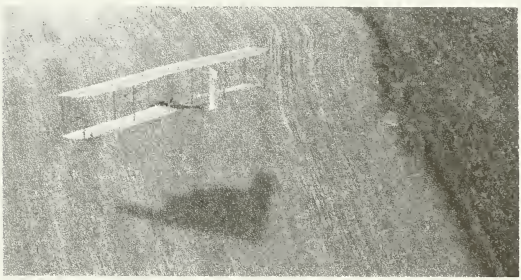
CURTISS WRIGHT Controls, Inc.
Embedded Computing

at the company's expense and are available for the entire universe of military programs. A prime contractor's ability to select from products already available rather than doing a ground-up development effort offers major R&D savings to the DOD in both time and money.

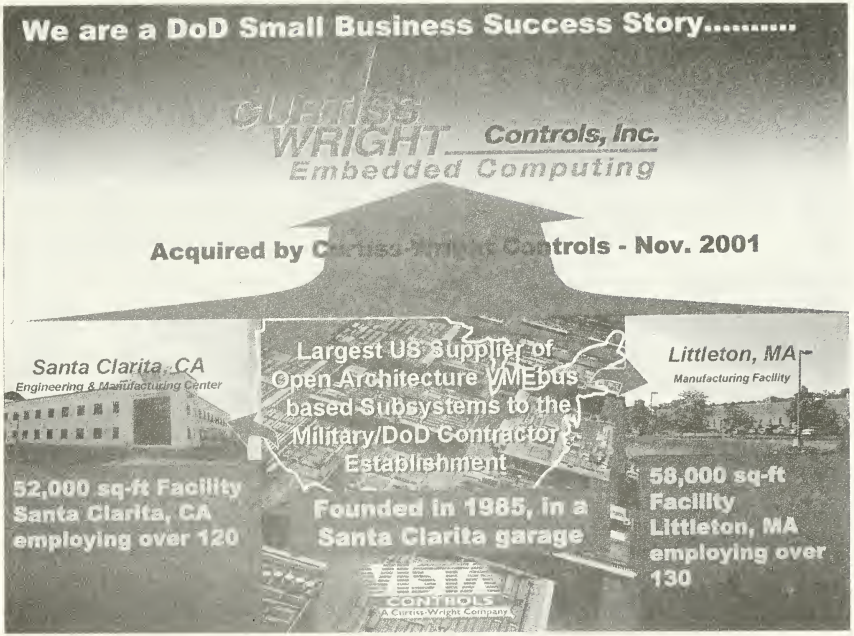
Therefore, the use of COTS components as key subsystem building blocks maximizes the re-use of both common hardware and software building blocks, tightly coupled with the programmatic support services we deliver. This approach decreases our customer's time-to-market and lowers their overall program development costs.

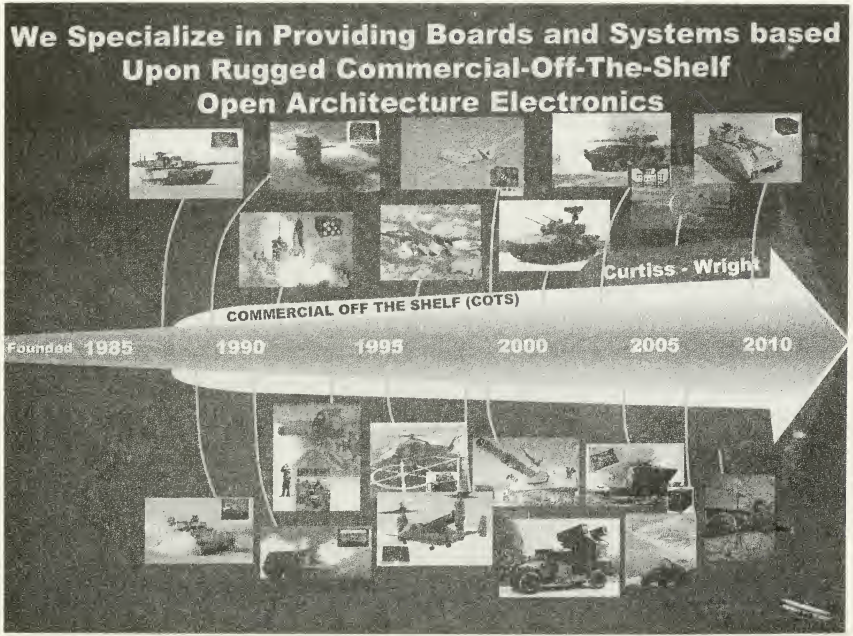
How can these technologies affect war on terrorism?

A key element in the war on terrorism is the ability to obtain information. Electronics must rank very high on the list of tools used to gather information; from remotely controlled vehicles: surface, naval or airborne, to electronic information gathering. The latest and most powerful technology is one of the greatest tools available for countering terrorism. Companies like VISTA Controls are at the forefront of converting that technology into deployable systems and providing them quickly and affordably, including off-the-shelf, low cost perimeter asset protection systems including QUPID.



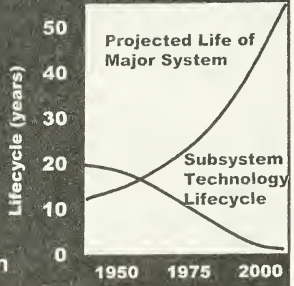
Innovative Technologies
for
Tactical Air and Land Forces
15 July 2004
Mr. David Dinse
Vice President & General Manager
VISTA Controls Inc.
CURTISS WRIGHT Controls, Inc.
Embedded Computing


We are a DoD Small Business Success Story.....
CURTISS WRIGHT Controls, Inc.
Embedded Computing
Acquired by Curtiss-Wright Controls - Nov. 2001
Santa Clarita, CA
Engineering & Manufacturing Center
52,000 sq-ft Facility
Santa Clarita, CA
employing over 120
Largest US Supplier of Open Architecture VMEbus based Subsystems to the Military/DoD Contractor Establishment
Founded in 1985, in a Santa Clarita garage
VSTA CONTROLS
A Curtiss-Wright Company
Littleton, MA
Manufacturing Facility
58,000 sq-ft Facility
Littleton, MA
employing over 130


We Specialize in Providing Boards and Systems based Upon Rugged Commercial-Off-The-Shelf Open Architecture Electronics
Curtiss - Wright
COMMERCIAL OFF THE SHELF (COTS)
Founded 1985
1990
1995
2000
2005
2010

Our COTS electronics are built specifically for military applications and have been a success both for DOD and the War Fighter

- COTS Saves money
  - Provides competition
  - Reduces life-cycle cost
- Reduces development risk
- Reduces time-to-market
- Applicable across multiple platforms
- Provides economical technology insertion capability



Our COTS products are built specifically to meet the rugged, high reliability requirements of the defense industry

Industry and Government Agree the COTS Business Model Works...

- The COTS business model works because the incentives and market pressures compel economically rational decisions, resulting in constant innovation, little waste, and a rising standard of development.
- COTS products adapt to the market needs
  - Open market success brings competition and lower prices
  - Competitive market creates broader choice
  - Commercial developer is motivated to minimize cost and shorten development cycles

COTS in Action

MGM-166 LOSAT

Electro-optical target acquisition & Fire Control systems

Stryker MGS

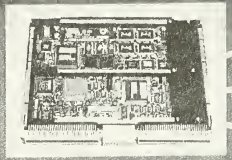
Mobile Gun System

CURTISS-WRIGHT Controls, Inc. Embedded Computing

COTS Works Across Multiple Services and Platforms

- Development costs spread across *all* users.
- One board many applications:

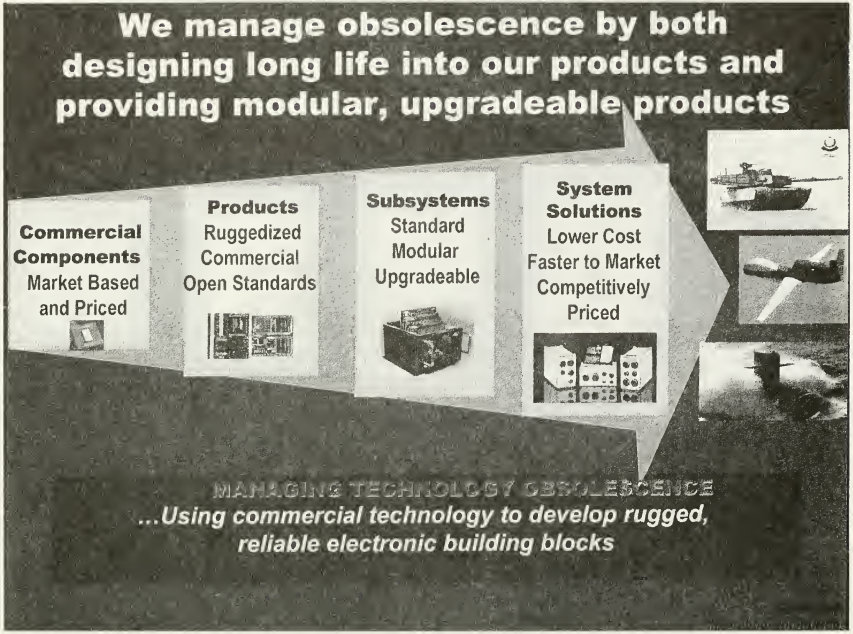
  VISTA Controls IR&D Funded Single Board Computer

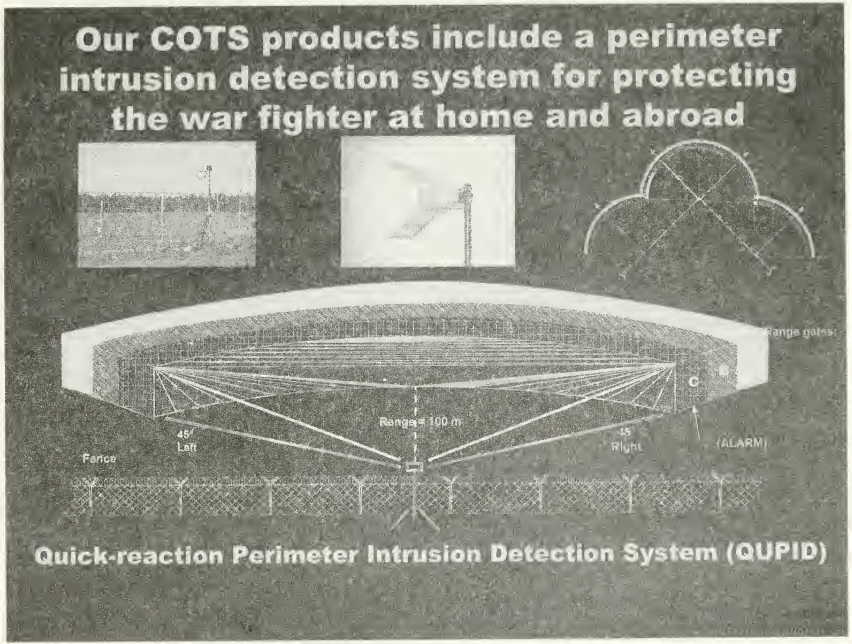


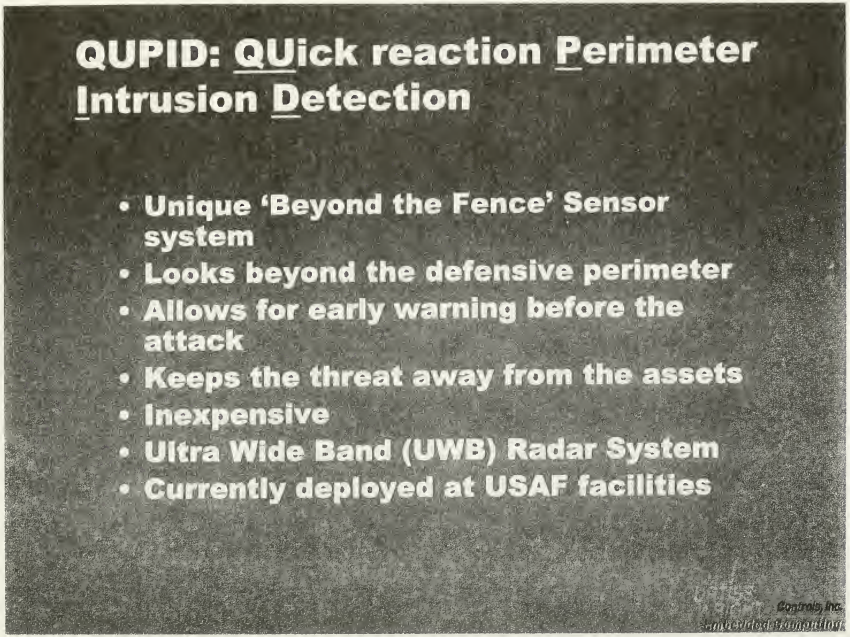
Same processor card

- Open, Standards-based architectures allows faster, lower cost Technology Insertion
- COTS represents a Solution for Electronic Component Obsolescence

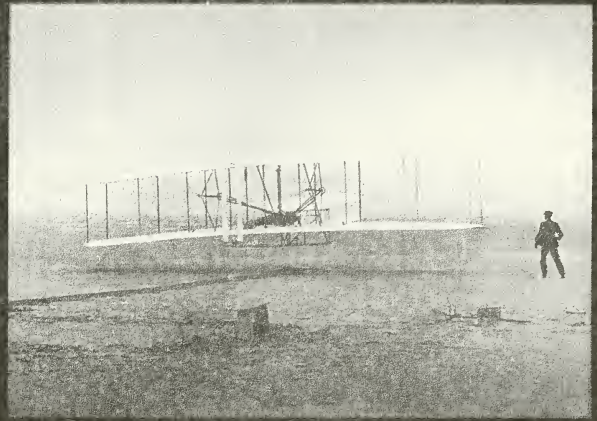
CURTISS WRIGHT Controls, Inc. Embedded Computing


We manage obsolescence by both designing long life into our products and providing modular, upgradeable products
Commercial Components
Market Based and Priced
Products
Ruggedized
Commercial
Open Standards
Subsystems
Standard
Modular
Upgradeable
System Solutions
Lower Cost
Faster to Market
Competitively Priced
MANAGING TECHNOLOGY OBSOLESCENCE
...Using commercial technology to develop rugged, reliable electronic building blocks


Our COTS products include a perimeter intrusion detection system for protecting the war fighter at home and abroad
Range gates
C
Range = 100 m
45°
Left
45°
Right
(ALARM)
Fence
Quick-reaction Perimeter Intrusion Detection System (QUPID)


QUPID: QUick reaction Perimeter Intrusion Detection
• Unique 'Beyond the Fence' Sensor system
• Looks beyond the defensive perimeter
• Allows for early warning before the attack
• Keeps the threat away from the assets
• Inexpensive
• Ultra Wide Band (UWB) Radar System
• Currently deployed at USAF facilities
Controls, Inc.
unparalleled innovation

From Kitty Hawk to Global Hawk.....



Thank you

QUESTIONS AND ANSWERS SUBMITTED FOR THE RECORD

JULY 21, 2004

QUESTIONS SUBMITTED BY MR. WELDON

Mr. WELDON. What recommendations do you have for the Committee that would expand the role of small business in Defense Department Research and Development?

Mr. KARANGELEN, Ms. JACOBUS, and Mr. BRODERICK. High-value research and development is being conducted by small business under the SBIR program and that DOD program managers have the contracting authority and resources to transition successful SBIR developed technologies into DOD Acquisition programs. (See the examples in Question #2 response, below.) We have six recommendations that we believe would serve to significantly reduce the barriers to widespread employment of successful SBIR and privately funded small business research and development in such DOD acquisitions. In order to effectively execute these recommendations we realize that additional effort will be required and welcome the opportunity to follow up with the Committee and staff in completing the work necessary to create good legislation on any or all of these points.

Our first recommendation is to establish an education initiative for prospective program managers at the Defense Acquisition University. The Defense Acquisition University should provide clear guidance on the advantages of using the SBIR and STTR programs to identify and qualify capable small businesses and their innovative technologies for transition to DOD Acquisition programs. On several occasions, invited speakers have lectured on this topic at the Defense Acquisition University, however we believe that a permanent segment of the program manager course should be established to address the transition of small business technologies, including those developed under the SBIR program. The Small Business Technology Coalition, in cooperation with the DOD Small Business Innovation Research program managers, would assist the Defense Acquisition University in developing the necessary teaching materials to implement this recommendation.

Our second recommendation is to establish a matching funds incentive for DOD program managers who make Phase III SBIR contract awards. The Phase III SBIR transition incentive would provide DOD Program Managers with matching R&D funds for each dollar of Program R&D committed to a Phase III contract with a SBIR company to continue development and/or insertion of SBIR-developed technology. The matching funds incentive should include a limit of not more than $2 million in matching R&D funds for any single SBIR effort. The second element of the Phase III SBIR transition incentive would provide matching procurement funds (up to a limit of perhaps $5 million per SBIR effort) for procurement of SBIR-developed technology end items through direct contracts with a SBIR company or for SBIR-developed items procured under a SBIR company's GSA schedule. Several potential sources of funding exist to support the Phase III matching funds incentive.

- One source of the matching funds is a set-aside of an additional 1% of DOD RDT&E and ½ percent of DOD Procurement in addition to those required by existing SBIR legislation for Phase I and Phase II. This new SBIR Phase III Authorization could be gradually phased-in over multiple years beginning in FY 2006 to provide a smooth transition.
- A second option for funding is an Appropriation (perhaps $50M to $100M in the first year) in a separate account for the matching funds incentive.
- A third option for funding is the reprogramming and employment of unused SBIR funds from any DOD component that does not fully execute the 2½% set aside provided for in the SBIR legislation (e.g. the Missile Defense Agency).

A Phase III SBIR transition incentive such as the one we propose would provide a powerful rationale for Defense Program Managers to incorporate successful small business technology developments in their programs. It would help to overcome the resistance that established programs of record for defense weapon systems typically have to emerging innovative technology opportunities that spring from the nation's small business community. This incentive would result in a growing number of Defense Program Managers who have experience employing small high-tech businesses

not only for providing rapid technology solutions, but also in the critical role of providing low cost risk mitigation and competitive alternatives in large complex Defense programs.

The payback from this initiative would be shortened development cycles, lower-cost systems, and higher quality systems—both from the specific contributions of innovative small companies and from the natural reaction of the large prime contractors to work harder in the face of small business efficiency and innovation. These properly transitioned Phase III efforts would stimulate DOD program managers to more often consider small business in providing competitive alternatives and rapid innovation in their programs and simultaneously broaden and strengthen the defense industry and manufacturing base in the United States.

Our third recommendation is to increase the incentive for prime contractors to achieve their small business subcontracting goals. These subcontracting goals are typically set in two ways. First, they can be explicitly stated as a percentage of the total contracted effort by the DOD program office in the Request for Proposal (RFP). Second, they can be implied by the prime contractor in the percentage of small business subcontracts proposed.

In the first case, where small business subcontracting goals are set by the DOD program office in the RFP as an explicit percentage of the total contracted effort, penalties such as fee reduction (or incentives such as award fee increases) should be employed to encourage prime contractor fulfillment of those goals. For example, the prime contract could require that at least 75% of the small business subcontracting goals be met in each year of the contract or fee reduction of 25% would be triggered for that period. Small business subcontracts should also be required to reflect the nature of the prime contract in the following manner: a large R&D contract for development of the Future Combat Systems for the US Army should include a significant fraction of small business subcontracts to high-technology small business and not be predominantly for nontechnical services (e.g. travel agent and janitorial services).

In the second case, where a prime contractor bids a small business subcontract as part of a proposal, the prime contractor should be required to execute the subcontract on award of the prime contract unless the prime can show due cause. In situations where subcontracts are not awarded, a letter report stating the reasons should be provided by the prime contractor to the program office and the SBA, and a rebuttal to that letter should be solicited from the small business. From these inputs the SBA and the program office could make a determination to either release the subcontracting requirement or not. This type of requirement would reduce the practice of prime contractors bidding small business subcontracts and not following through after award.

The relationship between the large DOD prime contractors and their small business subcontractors is increasingly important as the contracting trend in DOD moves to even larger and broader contracting such as with the Navy Marine Corps Internet (NMCI) and the Army's Future Combat System (FCS) as two examples. We therefore suggest that all RDT&E contracts over $100M have specific small business subcontracting goals included in the Request for Proposal and the awarded contract.

Our fourth recommendation is to require DOD program managers to include program plan specific milestones for the transition of SBIR developed technology and utilization of other small business developed commercial-off-the-shelf (COTS) technology. Program managers and their staffs should be directly involved in generation of SBIR topics, the selection of Phase I and Phase II SBIR awards, the evaluation of the Phase II contract products, and the transition of successful Phase II efforts into their Program. The Programs' long-range multiyear budget should include funds designated for Phase III contracts and other proven commercially available technologies from small businesses in the same manner these out-year budgets are established for other program activities. A very small cadre of exceptional Defense program managers has done this. (The Program Executive Office, Submarines for example). We believe that a small team selected from the Small Business Technology Coalition (SBTC) board of directors, DOD SBIR Program managers, and PEO Submarine staff could codify this practice into an effective DOD policy directive. We strongly encourage the Committee to work with the service Secretaries and DLA to have the policy directive, once developed, sent out to the program managers in their respective departments and in OSD

Our fifth recommendation is to grow the Defense Acquisition Challenge Program (DACP) by providing additional funding for DACP over the current $12M level and to focus DACP on SBIR Phase III and other small business-developed technology transitions. DOD AS&C is currently making a Herculean effort to span the technology transition "valley of death" between Research

and Development (e.g. conducted under SBIR and in small business corporate IR&D) and Acquisition Programs of Record. We believe $50M or more could be efficiently managed by DOD AS&C in the DCAP. We also suggest that Phase III SBIR transition opportunities and other proven small business technologies be given strong preference in selection of DCAP awards. We would like to take some additional time to study this and perhaps suggest other specific recommendations for DACP at a later date.

Our sixth recommendation is to establish an on-line database tailored for DOD program managers and their prime contractors that would catalog small business capabilities and products. This on-line resource would provide a key mechanism in helping DOD Program Managers and large prime contractors identify small business technology candidates for participation in large DOD programs and could be modeled after one of the successful on-line "yellow pages" websites with search engine capability. The need for increased use of superior and more cost-effective COTS products has been well established by the DOD. Yet, their incorporation into programs has been notably sluggish. Though COTS products often come from large companies (such as computer work-stations), as was shown at the 21 July hearing, many cutting-edge, commercially available products are developed by small business. Such a web site would provide further openness between the small business community and the government.

Mr. WELDON. What other examples can you provide of successfully transitioned SBIR technology into the mainstream of Defense Department Acquisition?

Mr. KARANGELEN, Ms. JACOBUS, and Mr. BRODERICK. The following cases represent a small cross section of DOD SBIR projects that have made significant contributions to mainstream DOD Acquisition Programs or resulted in innovative products in their own right. We have also provided the Army, Navy, and Air Force SBIR Success Story brochures that document additional examples.

In each of these cases, insightful DOD Program Managers made excellent use of the SBIR or STTR program to identify and qualify small business-developed technology for use in the DOD. There is compelling evidence that the SBIR transitions accomplished to date in the DOD represent a small fraction of the potential contribution that small business can make to better performing, more affordable, and more rapidly developed systems for our Nations defense.

Digital System Resources, Inc. (DSR)

Under the Navy SBIR program, DSR developed a new technology—the Multipurpose Processor (MPP)—that has had a major impact on the capabilities of the U.S. submarine fleet. The MPP is a submarine sonar processor, based on commercial-off-the-shelf technology that is used to determine the location of other submarines and ships in the area.

The design for the MPP proved to be very successful providing two hundred times the processing capability of the legacy sonar system that it replaced. The development costs of the MPP were one-tenth that of the previous sonar system and dramatically less than the projected costs of the new system proposed by the legacy contractor. The unit costs of the MPP were one thirtieth of the legacy system that it replaced, and costs of the system continue to drop sharply as the commercial market place provides greater processing capacity at lower cost. In 1994, the Navy awarded DSR a $40 million contract to build three engineering development models of the MPP. Subsequently, the Navy decided to use the MPP technology to upgrade the sonar equipment on most Navy submarines (SSN 688, 688I, and SSBN 726 [Trident] submarines), and to use it on the New Attack Submarines as the principal acoustic signal processor.

In addition, the open MPP architecture enables annual software improvements called Advanced Processing Builds (APBs). DSR has completed five Advanced Processing Builds to support the US submarine fleet. These Advanced Processing Builds bring annual performance improvements in our submarine sonar systems with dramatic results: APB98 providing a four hundred percent improvement over the legacy system it replaced, APB00 provided an eight hundred percent improvement, and APB02 provided a fourteen-hundred percent improvement over the legacy system.

Savi Technology, Inc.

Savi Technology, Inc. of Mountain View, California recently developed the industry's first radio computer tag, the "SaviTag," using a combination of Navy SBIR funding and private venture capital. The SaviTag—a radio transceiver with an embedded microcomputer—can be attached to military cargo containers, or any other crate or container used for transport and will automatically track the container's location and contents. The SaviTag was developed with just $2.5 million in SBIR funding (three awards) and has become a central element in DOD's Total Asset Visi-

bility effort. (This is the DOD effort to be able to pinpoint the location and content of every plane, ship, tank, and cargo container in transit around the world.) Savi has received military contracts to date totaling over $185 million, and DOD now uses the SaviTag in a large segment of its logistical operations, including almost all shipments into Bosnia.

The SaviTag solves a very real problem for DOD. During Desert Storm, over half of the 40,000 cargo containers shipped to the desert, including $2.7 billion worth of spare parts, went unused, according to a GAO report. The Army has estimated that if an effective way of tracking the location and content of the cargo containers—such as the SaviTag—had existed at that time, DOD would have saved roughly $2 billion. The SaviTag has already resulted in major efficiencies in our logistical operations in Bosnia, although a precise estimate of the savings has not yet been made.

The SaviTag also has major applications in the private sector—particularly in the commercial trucking, rail, and shipping industries. Savi's sales to the private sector are projected to be $20 million this year, and are increasing rapidly, with important applications in the commercial trucking, rail, and shipping industries.

Integrated Systems, Inc.

Under the DOD SBIR program, Integrated Systems of Sunnyvale, California developed a technology for the efficient writing of embedded software, including software for a robot to load munitions, which had important spin-offs in the automobile industry. Cumulative sales revenues to date from the SBIR-developed technology exceed $100 million, about 15 to 20 percent of which are from sales to DOD or prime contractors. Integrated Systems, which began as a start-up company, is now publicly traded on the NASDAQ with market valuation of just under $400 million.

Integrated Systems' embedded software is used in a wide array of commercial applications, including the "intelligent" gas pumps that enable customers to pay at the pump with a credit card. Among its many defense applications, Integrated Systems' technology was used to develop all of the software for the DC–X experimental launch vehicle. According to the prime contractor (McDonnell Douglas), it reduced both the cost and the time of software development by more than 50 percent. DC–X was the first launch vehicle project in which software was developed ahead of hardware and within schedule and budget.

Silicon Designs, Inc.

Under the Navy and MDA SBIR programs, Silicon Designs Inc. of Issaquah, Washington developed the "accelerometer" used in most DOD missile systems, including Patriot PAC–3, AIM–9X, ESSM, Hellfire 2, and Javelin. The accelerometer is a sensor that tells the missile to arm itself when it reaches a pre-programmed acceleration. This technology replaced a mechanical switch used in earlier missile systems, which was significantly less reliable and cost five times the price.

Silicon Design's accelerometer is also used in all new Ford and Chrysler automobiles produced in the United States. In the automobiles, it triggers the inflation of the airbags when the car decelerates abruptly during an accident. As in the missile systems, this technology replaced a mechanical switch that was substantially less reliable, several times as expensive, and, unlike the accelerometer, could not be tailored to respond differently to different types of impacts. Total sales of the accelerometer to DOD and commercial customers are $40 million per year. DOD's initial SBIR investment was just $1.2 million.

Science Research Laboratory, Inc

Under four DOD and DOE SBIR awards between 1989 and 1993, Science Research Laboratory, Inc. (SRL) of Somerville, Massachusetts developed a cluster of solid-state pulsed-power technologies that made excimer lasers, for the first time, a commercially viable tool for the UV lithography now used in writing current-generation integrated circuits onto computer chips. Specifically, these SBIR-developed technologies: Eliminated missing laser pulses observed with the older ("thyration switch") technology, thereby stabilizing the laser power, improving dose control to the semiconductor wafer, and greatly improving chip yield; and increased the lifespan of the laser driver by a factor of 100 and the lifetime of the laser head by a factor of 10–20, thereby reducing the annual maintenance costs of the laser from $250,000 to $50,000.

As a direct result of these technologies, excimer lasers now represent the state-of-the-art technology for writing circuits onto a chip. The use of excimer lasers has enabled a reduction in the critical dimensions of the circuits from 0.35 microns to 0.25 microns with the existing KrF laser technology, and will ultimately lead to critical dimensions of 0.1 microns with the new ArF laser technology. The result has been a significant increase in the computing power of virtually every military and commercial system developed in recent years. SRL commercialized these tech-

nologies through a license to Cymer, Inc., which went public in 1996 based on these technologies. Cymer now produces and sells approximately $200 million annually in lasers to Cannon, Nikon, and ASML for use in chip production around the world.

ViaSat, Inc.

Under the Air Force SBIR program, ViaSat, Inc. of Carlsbad, CA, developed a "Demand Assigned Multiple Access" networking technology that is now used for both military and commercial satellite communications. Subscribers equipped with this technology can obtain access to a satellite channel "on demand"—which means that each subscriber uses satellite resources only for the time they are communicating rather than setting up a dedicated channel (under the previous technology) for an extended period of time. The network can thereby serve approximately 10 times as many users during the course of a day. ViaSat's military sales and orders to date are approaching $90 million for subscriber and network control terminal equipment. Initial commercial sales to date (to AT&T, Hutchison, and others) are $7 million and increasing rapidly, with commercial satellite communication markets reaching into the hundreds of millions of dollars annually.

Arroyo Optics, Inc.

Under the DARPA and MDA SBIR programs, Arroyo Optics of Santa Monica, California developed a technology that enables all-optical routing of communication signals from one fiberoptic cable to another. This technology has major cost and performance advantages over existing technologies, in which the routing of a signal from one cable to another requires that all of the optical signals in the first cable be converted first to electronic signals and then back to optical signals. This technology reduces by an average of 70 percent the number of signals that need to be converted, and requires far less conversion equipment. The result is significantly less signal degradation and lower cost and, ultimately, higher-performing, less-expensive communications for commercial and military customers.

Arroyo obtained approximately $500,000 in funding from angel investors to match its phase II SBIR awards in 1996. The company has since raised an additional $26 million in venture capital, and is currently building a production facility, with initial production orders to begin by the end of this year. Projected sales exceed $100 million per year.

Active Technologies, Inc.

Under the DARPA SBIR program, Active Technologies, Inc. developed a high-output, small sized alternator that led to development of the "Lightning Charger"—a highly successful commercial product with important military applications. The Lighting Charger is an engine drive alternator that weighs 18 pounds and has 900 watts of power—roughly one-third the weight and twice the power of the previous state-of-the-art alternator. It is used for powering such equipment as emergency lights and refrigerators, and to start vehicles including cars and airplanes. In 1994, the Lightning Charger was featured in *Popular Science* as one of the best new products of the year, and has since generated $8 million in sales, with an additional $90 million anticipated. Active Technologies has been acquired by Coleman Powermate, which sells the Lightning Charger to consumers through major home appliance stores.

This technology has yielded important military applications. Military customers include the Army, where it is used to start tank engines when the batteries have died. The Army is also funding development of a follow-on product based on this technology—a general-purpose, manportable generator that soldiers will carry in the field for use in powering communications, hospital, and other equipment.

Should the Committee wish to review additional stories, SBA and the services have directed us to lists of such stories posted on the Internet. Here are the URL's:

Army: www.aro.army.mil/arowash/rt/sbir/stories.htm

Navy: www.navysbir.com/transitions04-1.pdf

Air Force "Impact" Success Stories (Phases I, II & III): www.sbirsttrmall.com/Library/SBIRImpactStory.aspx

Air Force "Transition" (to the Force) Success Stories: www.sbirsttrmall.com/Library/Default.aspx

We thank you again for your questions and your willingness to hear our perspectives on the nation's small business community, its importance, and future potential in support of the country's defense. Cases have clearly shown that small business

can provide superb technology at low cost and on short schedules. We welcome any additional opportunity to work with you on this important matter.

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